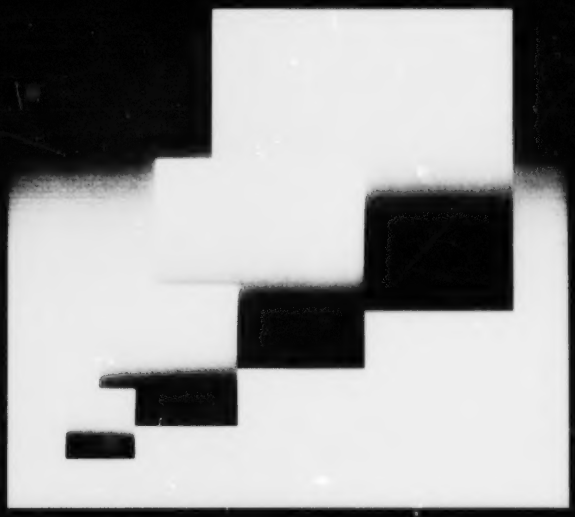

Trade Liberalization and the Multinationals

Donald G. McFetridge

A study prepared for the Economic Council of Canada

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Foreword

This study was undertaken as part of the Council's recent project on manufacturing firm adjustment. The Council Research Report on this subject, *Adjustment Policies for Trade-Sensitive Industries*, came out in July 1988. The overall aim of this project has been to improve our understanding of how firms, individuals and governments react, both separately and together, to change in international competition. Two groups of studies were undertaken: the first looked at the degree of change that is ongoing in the manufacturing sector, while the second examined the experience or record of adjustment in certain selected trade-sensitive industries, including shipbuilding, textiles, clothing and footwear. The present study falls into the first category.

In considering the ongoing adjustment that occurs in the Canadian economy, concern has frequently expressed that foreign-owned firms – multinational corporations in particular – may respond differently to the forces of change because they already have a worldwide range of investment options from which to choose when deciding where to shift or expand their operations. This has given rise to a number of issues: that multinational enterprises (MNEs) may be more inclined to shift production to countries with lower-cost inputs (including lower wages); that MNEs may be more prone to close down their plants in Canada than are domestically owned firms; that Canada is largely absent from the high-growth R&D industries where MNEs often play an important role; and that as tariff barriers fall, MNEs with plants in Canada will relocate in the United States rather than rationalize their Canadian operations. It is on those issues that this study focuses its attention. The study results suggest that Canadian and foreign-owned firms often respond to the pressures for change in much the same way. Where differences do arise, however, the presence of foreign-owned firms appears to enhance, rather than diminish, the ability of the Canadian manufacturing sector to adjust to the pressures for change.

Don McFetridge has written widely on economic and Canadian public policy issues as well as acting as an advisor to governments, including that of Research Co-ordinator with respect to the Industrial Structure group of studies conducted for the Royal Commission on the Economic Union and Development Prospects of Canada. Professor Don McFetridge is currently a member of the Department of Economics, Carleton University, Ottawa.

Judith Maxwell
Chairman

1 Introduction

The purpose of this study is to investigate the extent, nature and determinants of changes in the location and organization of production by multinational enterprises in recent years. The emphasis is on the changes experienced by U.S. multinationals and their impacts on Canada.

A variety of concerns motivate this study. These begin with the perceived movement of production activities "offshore" from North America and Europe to less-developed countries and the Far East. Multinationals, virtually by definition, have played a significant role in this movement.

The offshore movement of production raises the fear that high-paying manufacturing jobs in developed countries will be lost and replaced by possibly less well-paying service jobs. The fear has also been expressed that, as the manufacturing activities of the developed countries wane, they will not only "forget" how to manufacture but will lose control of the process of innovation. The ultimate expression of this fear is in the so-called "hollow corporation" thesis (*Business Week*, 3 March 1986), wherein U.S. multinationals contract out their productive and, perhaps ultimately, innovative activities to foreigners and confine them to financing, marketing, public relations and legal manœuvering. Canadians have traditionally been concerned that the local affiliates of U.S. firms are engaged in sales and distribution (warehouse) activities rather than production and innovation. The hollow corporation thesis reinforces these traditional fears. If the U.S. parent is hollow, what will become of its Canadian affiliate? A less extreme manifestation of this concern is that while U.S. parents may be able to adapt to the globalization of markets, Canadian affiliates, with their short production runs, obsolete equipment and limited experience in export markets, may not be (Lush, 1987; Saul, 1988).

Canada is not, of course, the only host country to express these concerns. A recent study from the Organisation for Economic Co-Operation and Development (OECD, 1985) reports that member countries are apprehensive about three aspects of multinational response to technological change and increased international competition. First, multinationals may perceive and respond to these forces so rapidly that there is not sufficient time for consultation with the local work force or community. Secondly, the dominance of global considerations may result in the closure of local affiliates which are viable or potentially viable. Finally, improvements in information technology may result in the centralization of certain management functions (marketing, finance, R&D), leaving local affiliates with less autonomy.

The prospective Canada-U.S. free-trade agreement has intensified the long-standing Canadian concern with the adjustment strategies of multinationals. Fears have been expressed, first, that Canadian affiliates of U.S. firms, often called tariff factories, will be closed and the Canadian market will be supplied from larger, more efficient U.S. plants. Secondly, it is feared that surviving Canadian affiliates will be integrated more tightly into North American production arrangements and will lose what little autonomy they have. Finally, there is an apprehension that U.S. firms, adjusting in the aforementioned manner, will crowd out Canadian firms.

This study reviews published econometric evidence on the extent and nature of the locational and organizational responses of multinational firms to changes in global markets and in technology. New evidence derived from surveys of U.S. foreign direct investment published by the U.S. Department of Commerce is also presented.

The approach taken in this study is largely retrospective. Inferences regarding the likely response of multinationals to future changes in international competition are drawn from the past adaptive behaviour of this group.

The adaptive behaviour of individual affiliates of multinational enterprises can be compared either with affiliates in other countries or with domestic firms within a particular country. The new evidence presented here focuses largely on interaffiliate differences in adjustment behaviour.

Two types of adjustment are examined. The first is locational adjustment. The task in this case is to identify the magnitude, direction and industrial characteristics of international shifts in the location of production by U.S. multinationals. The theory of locational adjustment and its published econometric studies are discussed in Chapter 2. Some new evidence is presented in Chapter 5.

The second form of adjustment is organizational. This study focuses on changes in the organization of production. The key question here is whether multinationals have rationalized production internationally in recent years and, if so, whether the pace of rationalization differs systematically from country to country and industry to industry. A discussion of the theory of, and existing empirical evidence on, production rationalization is presented in Chapter 3. Some new evidence on rationalization appears in Chapter 6.

There are other ways of predicting the response of multinationals or other firms to changes in international competition. Intentions surveys are widely used. The results of some of these surveys are summarized in Chapter 3. Simulation models have played an important role in analysing the possible consequences of the proposed Canada-U.S. free-trade agreement (Proulx, 1986). Some of the implications of the most prominent of these models (Harris and Cox, 1984) are also summarized in Chapter 3.

While many readers will be interested primarily in whether production has been shifted abroad or rationalized at home, a necessary preoccupation here is with measurement. Published data do not provide unambiguous measures of changes in either the location or organization of production. The conclusions drawn from the analysis of these data depend, to varying degrees, on both the period of measurement and specific measures chosen. The new evidence presented shows that more trade tends to be associated with an increase in the relative importance of Canadian affiliates within U.S. multinationals. By itself, this evidence is not particularly compelling. Taken together with the results of intentions surveys and simulation models however, it implies that Canadians have much more to fear from the restriction of trade than from its liberalization.

2 Locational Adjustment by Multinationals

Introduction

The purpose of this chapter is to examine the factors giving rise to changes in the international distribution of productive activity within multinationals. It begins with an analysis of the circumstances under which it is advantageous to shift production from one country to another, and then proceeds to investigate whether multinationals should be expected to respond, and do respond, to these circumstances differently than locally owned firms.

Next, the case in which changes in the international distribution of the activities of multinationals occur without any overall relocation of production is dealt with. We are observing changes in the degree of multinational participation in local production. This is a consequence of changes in the benefits derived form the multinational organizational form itself. It may manifest itself globally or in a particular set of economies.

Factors Associated with Changes in the Location of Production

In this section, the factors which determine the attractiveness of a particular national economy as a location for production are examined. Particular attention is paid to the circumstances which may encourage domestic producers to relocate abroad (offshore). In the following section, the evidence on the respective patterns of locational adjustment by local and multinational firms is examined.

The first factor which may lead to a change in the location of production is a change in the production or distribution technology. Consider a change in production technology which increases the relative magnitude of plant-specific fixed costs. An example of this type of technological change might be the introduction of computer-aided design, engineering and manufacture (CAD/CAE/CAM). Some authors such as Gold (1982) have argued that CAD/CAM/CAE reduces variable costs but increases fixed costs at the plant level.

An increase in plant-specific fixed costs should, other things being equal, reduce the number of plants or production locations. This point has been made recently in a theoretical context by Horstman and Markusen (1986) and has also been made by Caves et al. (1977). Others, such as Baranson (1985), have linked the two, suggesting that CAD/CAM/CAE will result in a centralization of production.

A reduction in the number of production locations may result in the elimination of some domestic production facilities, but it need not reduce the local share of worldwide production. There may be a *pro rata* reduction in the number of establishments in each country. It is more likely a situation in which production in some countries was marginal prior to the change in technology so that, given the tariff environment and factor prices, centralization involves either the elimination of, or a disproportionate reduction in, local production. Notice that this occurs within the context of a given trade policy environment. Trade policy changes which increase the size of the market to which local producers have access can offset the effect of consolidation on the local share of global production.

Technological changes in distribution can also reduce the number of production locations. A decrease in transportation costs will, other things being equal, reduce the optimal number of plants. Similarly, changes in warehousing and storage techniques and practices can change the distribution and perhaps the number of production locations. Specifically, an increase in storage or warehousing costs should draw a supplying industry into closer proximity with its customers. If these customers reside abroad, there will be a decrease in domestic production.

Baranson cites the adoption of the "just-in-time" method of production wherein users carry minimal inventories of inputs and thus require suppliers to be in relatively close proximity as an example of the effect of changes in distribution methods on the location of production. It should be noted that the advantage of minimizing inventories depends, in part, on the "inflation tax" levied on them. The advantage of reducing average inventories is thus much smaller now than it was several years ago.

More fundamentally, the requirement for closer proximity may be satisfied by the relocation of either or both the using and supplying industries. Baranson's general conclusion that Canadian suppliers will necessarily migrate to the

United States to be in closer proximity to U.S. users may, in fact, hold true in only a few cases.

Given technology and the tariff environment, the global distribution of production may be altered by worldwide changes in relative factor prices. The consequences here are much the same as in the case of technological change. Consider, first, the consequences of an increase in the relative price of labour. This will lead to a substitution in favour of physical and human capital and will, in the general case, change both the scale elasticity and the minimum efficient scale of production. The locational response would be as described above.

To make this more intuitive we might suggest, for example, that if transportation and distribution were more labour-intensive than production, an increase in the relative price of labour in all countries would have the effect of increasing relative transportation costs and thus, by the reasoning above, the number of production locations.

On the production side, an increase in the relative price of labour will lead to greater physical capital intensity and an increase in minimum efficient scale if capital inputs are characterized by indivisibilities. Similarly, an increase in human capital (knowledge) intensity will increase minimum efficient scale if the knowledge is plant-specific, but is more likely to result in close linkages, either by ownership or by contract, among plants. In the latter case, a change in relative factor prices does not change the location of production but may increase its proportion which is accounted for by multinationals. This possibility will be considered subsequently in greater detail.

The precise consequences of a global change in relative factor prices for the international distribution of production depend on the technology of the industry in question. The crucial point is, again, that these changes take place within the context of a given trade policy environment. Leaving trade policy unchanged does not necessarily minimize domestic adjustment costs. Indeed, adjustment costs may be lower with trade liberalization than without it.

A third factor which will affect the attractiveness of local production is local production costs. To this point, we have been considering worldwide technology and factor price changes. Now we must consider the consequences of purely domestic change in production costs. From the point of view of a single domestic industry, a localized increase in production costs may result from any of congestion, tighter pollution controls, higher taxes, more restrictive work rules, poorer labour relations, poorer quality natural resources or higher factor prices. It may reflect either an artificial scarcity, as in the case of increased union power, or a real scarcity. The latter simply implies that the resources required by this industry have higher-valued uses in other industries, that is, that the national comparative advantage lies elsewhere. In each case, we would expect a decline in domestic production. This will be true for both foreign- and domestically owned firms although, as suggested above, their respective patterns of decline may differ.

Let us now turn to the consequences of national increase in (unit) production costs. This is sometimes a consequence of a domestic inflation rate which exceeds the respective inflation rates of a nation's trading partners. The usual outcome is a realignment of exchange rates which leaves all concerned back where they started and the international distribution of production unchanged.

An increase in the national price level which is not offset by exchange depreciation is equivalent to an improvement in the nation's terms of trade. This may be a consequence of a higher domestic productivity growth rate or of an increase in the demand for a unique domestic resource. The improvement in the terms of trade implies a higher level of national income which reflects, in turn, the productivity improvement or the increased resource rents accruing to residents.

The exchange appreciation will, in this case, make local production less attractive in some industries. Under the first assumption, domestic production in industries with less than the national average rate of productivity growth would become less attractive. Under the second assumption, domestic production in the non-resource sectors would become less attractive. An example here is the so-called "Dutch disease" about which a great deal has been written.[1]

A fourth influence on the attractiveness of local production is the public policy environment. The location of production may be influenced by a number of aspects of public policy including foreign investment controls (Conference Board of Canada, 1984, pp. 56-64), tax policy (Hartman, 1981) and trade policy. The discussion here focuses on the locational effects of trade policy changes.

Under the assumptions of standard trade models (homogeneous products, constant returns to scale and perfect competition), a decrease in domestic tariff protection would lead to the contraction of import-competing industries and the expansion of export industries. In the absence of other distortions, there will also be a small increase in national income.

It is widely agreed that the standard model is not appropriate for analysing the consequences of trade

liberalization. The major reasons for this are that much of Canadian trade involves specialized natural resources and that the Canadian industrial sector is characterized by increasing returns to scale and imperfect competition (Markusen and Melvin, 1984; Harris, 1985).

There have been a number of studies of the consequences of the removal of tariff and non-tariff barriers by Canada in an environment characterized by increasing returns to scale, product differentiation and imperfect competition (prices in excess of marginal cost). These are well summarized by Proulx (1986) and by Wonnacott (1987).

The most widely cited study is that of Harris and Cox (1984). These authors examine the effects of various forms of trade liberalization on both the amount and the organization of domestic production. The effect of trade liberalization on the organization of production will be discussed in Chapter 3. As far as the effect on productive activity is concerned, Harris and Cox conclude that the industries in which local production declines are characterized by constant (or weakly increasing) returns to scale, relatively inelastic export demand and relatively intensive use of labour.

The essential qualification to the standard theory raised by the new theories of trade and industrial organization is that trade liberalization need not result in a decline in import-competing industries. It can induce all domestic producers to exploit potential economies of scale and scope and this may either increase or decrease local value added or employment in a particular industry. If optimally specialized facilities remain uncompetitive internationally, local production ceases. Harris and Cox conclude that the latter eventually is not typical. For them the general picture is one in which the percentage decrease in cost achievable via rationalization is sufficient to cover possible decreases in the rate of tariff protection.

The assumptions of Harris and Cox are discussed in greater detail in Chapter 3. For the present, it is sufficient to note that the most contentious of these are: a) there is a market niche for domestic import-competing goods (i.e., imports are not perfect substitutes for domestic import-competing goods); and b) domestic producers do not exploit available scale economies unless forced to do so by reductions in the price of competing imports.

Other investigators have found that trade liberalization would result in a significant contraction of output in a broader range of industries than did Harris and Cox. The results of all research to date are summarized and compared by Wonnacott (1987, pp. 34 and 35). He finds general agreement that North American free trade would increase Canadian output in the forest products, paper and transportation equipment industries and decrease it in the furniture industry. In all other cases, there is at least some disagreement as to the effect of trade liberalization on Canadian output.

Patterns of Locational Adjustment: Theoretical Considerations

It has been argued that there are a number of changes in the economic and technological environment of an industry which could make a particular country less attractive as a production location. One might expect that both foreign- and domestically owned firms would respond to these changes in a broadly similar fashion. That is, if local production becomes less attractive, both groups will reduce it, perhaps closing local production facilities.

It has been suggested, however, that both respective adjustment paths and the new configurations of multinational and domestic firms may differ. Specifically, it is argued that, given the characteristics of the industry in question, multinationals will be more responsive than domestic firms to changes in the attractiveness of local production. According to this view, multinationals can and do relocate production quickly in response to local factor price, exchange rate and regulatory changes and that domestic firms are either less inclined or less able to do this.

The geographic mobility of production is likely to depend principally on industry rather than firm characteristics. That is, the ability of any firm, domestic or multinational, to shift production internationally depends crucially on the characteristics of the production process. The opportunity to shift production will be greater: a) the higher the value-to-weight ratio of the product and its components (the less important are transportation costs); b) the greater the degree of separability of one stage of production from another; and c) the less capital-intensive is the production process (or, at least, some separable component of it).

The most prominent examples of this type of industry are electronics and textiles and apparel. Grunwald and Flamm (1985, p. 7) note in this connection that:

> High value-to-weight ratios of apparel and electronics reduce transport costs as a barrier to trade and production operations are easily separated into distinct steps – manufacturing of components, assembly, testing and packaging – that do not require physical contiguity. All these products require relatively small inputs of capital and large inputs of unskilled

labor in the assembly stage when labor-intensive methods are used.

Given industry characteristics, the multinational organizational form may itself entail several adjustment advantages. Multinationals may have advantages in collecting and transmitting technological and market information. This is a consequence of both their global operation and the relative efficiency of internal information transfer.

The OECD (1985) makes a similar argument:

> Many of the current adjustment pressures are international in nature so that multinational enterprises may have an earlier exposure and sensitivity to these (p. 22).
>
> . . .
>
> The tendency of multinational enterprises to be well represented in high technology sectors and to use the most modern production systems means that their general technological superiority may cause them to react earlier to the possibilities offered by technological developments and be more ready in adopting them (p. 29).

Sunk costs may also have a role to play. A multinational with the capability of producing and selling in countries A and B is more likely to shift production between these two countries in response to exchange rate variations than are independent A and B country firms which must incur set-up costs either to produce or sell in the other country. The story would be different if affiliates of the multinational were specialized by stage of production (i.e., stage 1 in country A and stage 2 in country B). In this case any shift in the location of production would require that additional set-up costs be incurred. The locational response of the multinational to a change in the exchange rate might not differ from that of independent local firms.[2]

If there are some reasons to believe that the locational response of multinationals is faster, are there also reasons to believe that it is more extreme than that of local firms? Faced with a cost disadvantage, are multinationals more likely to severely curtail or even close location operations?[3]

Again industry characteristics play a dominant role. Relative production costs may not be prominent in the locational decision. If they are, a migration of production to low-cost sources is inevitable over the longer term. It is often argued, however, that there are benefits from maintaining diverse sources of supply (see Kogut, 1985, for example). As a consequence, multinationals will, to the extent that scale economies permit, locate production in a variety of countries promising roughly similar production costs over the longer term. While transitory changes in exchange rates may evoke marginal shifts of production within this group, discrete shifts (i.e., cessation of local production) are unlikely unless a significant and enduring cost disadvantage emerges.

There is no reason, in principle, why the same locational diversity of production would not emerge in an industry composed of independent local firms. Thus while we do not expect locational volatility from multinationals, neither do we expect it from an industry composed of independent local (exporting) firms.

Patterns of Locational Adjustment: Evidence Intercountry Shifts in Production

Flamm (1984) analyses the determinants of the location of offshore semiconductor production by U.S. multinationals. He investigates the sensitivity of the distribution of offshore production to relative wage and exchange rates.

Flamm finds, first, that production facilities are not concentrated in the lowest cost and the low-cost countries. There is a diversification of sources.

Second, local wage and exchange rates matter. The proportion of U.S. semiconductor imports accounted for by a particular offshore location (one of Mexico, Taiwan, Hong Kong, Singapore and Korea) decreases as the local wage rate (in U.S. dollars) increases. A 1 per cent increase in the local wage rate results in a 1.1 per cent decrease in U.S. semiconductor imports from the country involved. Virtually all (95 per cent) of the adjustment takes place within one year.

Flamm characterizes the locational response to local wage and exchange rates as quick but modest in magnitude. Colourful stories about whole factories disappearing overnight are not representative of the experience of this industry. There is a demonstrated preference for maintaining a variety or portfolio of sources of supply.

Grunwald and Flamm (1985) provide case study evidence which confirms the relative stability of the offshore assembly operations of both U.S. multinationals and those of independent subcontractors. Generalizing from their investigations of a variety of offshore operations in Columbia, Haiti and Mexico and from their study of the semiconductors industry, Grunwald and Flamm conclude:

> . . . contrary to expectations . . . assembly operations have shown a remarkable stability in developing economies . . .
>
> The general stability and growth of assembly production in many developing countries implies that such activities are not

> exceptionally sensitive to changes in relative wages among countries . . .
>
> Sharp increases in relative wages, however, will provoke shifts in the location of manufacture of products with high ratios of value to weight, such as semiconductor devices, which will tend to be more footloose because of their low transport costs. Thus the steep wage increases in Mexico during the mid 1970's contributed to the shift of semiconductor assembly to Malaysia and other East Asian countries. This was probably the most important loss of a market share in a major assembly product attributable to shifts in relative wages that can be noted among countries (pp. 235 and 236).

The Propensity of Offshore Sourcing — The practice of shipping semifinished goods abroad for further processing and subsequent reimportation is called offshore assembly. The characteristics of U.S. industries most likely to engage in offshore assembly have been investigated by Jarrett (1979).

Jarrett finds that during the 1971-76 period, the proportion of value-adding activity occurring offshore tended to be greater in U.S. industries characterized by:

- lower product transportation costs,
- higher labour intensity,
- higher average production wages and labour force skill requirements, and
- a greater incidence of unionization and strike activity.

Jarrett obtains other results which are consistent with the proposition that offshore assembly is facilitated by separable stages of production and a readily transferable technology.[4]

It is clear from these results that certain types of production are more likely to migrate to low-wage countries than others. The question remains whether, given industry characteristics, multinationals are more inclined to shift production offshore than are local firms.

This is not an easy question to answer. First, it is difficult to hold industry characteristics constant. Multinationals tend to dominate some industries and be virtually absent from others. There are relatively few cases in which multinational and local firms coexist under similar circumstances.

Second, multinationals are, by definition, already engaged in some form of onshore production. What is important is the rate of change in this activity when relative cost conditions change. That is, we wish to compare the respective marginal propensities of multinational and local firms to engage in offshore assembly or, more broadly, offshore sourcing.

An exercise of this nature has been conducted by Williamson (1986). Williamson analyses the effect of interindustry differences in the relative price of imports on the import propensity of a cross-section of 36 Australian manufacturing industries over the 1968-78 period. He finds that the higher is an industry's domestic price relative to the price of competing imports, the greater is the share of the domestic market accounted for by imports. For a given relative price, the share of the market ceded to imports increases with the degree of foreign ownership.

Williamson also finds the greater is the *rate of change* in an industry's domestic price relative to the price of competing imports, the greater is the share of the domestic market accounted for by imports. For a given rate of change in relative prices, the market share of imports decreases as the degree of foreign ownership increases.

Williamson interprets these two results as implying that the sourcing decisions of multinationals are *more* responsive to *long-term* price differentials and *less* responsive to *transitory* price fluctuations than are the sourcing decisions of domestic firms.

Entry and Exit — Entry and exit studies are another source of evidence on differences in the respective responses of foreign and domestic firms to changes in local production conditions.

There are three recent studies which compare the exit behaviour of domestic and foreign-owned firms in Canada. The first is from Shapiro (1983). Shapiro finds that interindustry differences in exit rates by both foreign and domestic firms are unrelated to industry growth or profitability. Indeed, interindustry variation in exits by foreign firms is largely unsystematic. This may imply that local factors do not matter. It may also imply that factors bearing on the exit decisions of foreign firms have been omitted from the model.

As far as domestic firms are concerned, there is some indication that tariff protection has retarded exit while the disadvantages of small-scale production has accelerated it.

The second exit study is from Baldwin, Gorecki and others (1983). These authors find that interindustry differences in exits by foreign firms are unrelated to industry

growth and profitability. Higher growth rates of imports appear to reduce exits, if anything. Again, interindustry differences in the exit rate of foreign firms appear to be largely unsystematic.[5]

Exit by domestic firms is retarded by higher rates of (total) demand growth and by decreases in minimum efficient firm size. Contrary to expectations, increases in imports also reduce exits.

Baldwin, Gorecki and others also investigate exits which involve the scrapping of a plant by firms which continue to operate in the same industry (1983, Table 18). While the exit behaviour of foreign-owned firms is, again, less systematic than domestic firms, the two groups show similar and perverse patterns of behaviour. Specifically, industries characterized by faster export growth have more exits, both domestic and foreign. Industries experiencing faster import growth have fewer foreign and domestic exits. Further investigation leads the authors to conclude that these results are due to a lack of exits in the industries in which demand has fallen most. Among industries characterized by moderate decline or by growth, the process functions as expected.

MacLachlan (1986) has investigated the determinants of interindustry differences in the rate of plant closure in Ontario between 1981 and 1985. He finds that the closure rate increases among both foreign- and domestically owned plants with both the incidence of unionization and the rate of growth of imports. The closure rate among foreign-owned plants is also a decreasing function of assets per plant, the fixed/total asset ratio and, counter-intuitively, labour intensity (1986, Table). A considerable proportion of the interindustry variation in both foreign- and domestically owned plant closure rates remains unexplained.

Given the nature of his statistical techniques, MacLachlan's study must be regarded as preliminary in nature. Nevertheless, he does find some links between the domestic economic environment and exits by foreign firms. Taken at face value, his results imply that a given increase in the rate of growth of imports would increase the closure rate of foreign-owned plants about 2.7 times as much as it would increase the closure rate of Canadian-owned plants.

Daly and MacCharles (1986, pp. 77-84) compare the exit and relocation behaviour of 15 matched pairs of foreign- and Canadian-owned firms. They find that:

> Even though the interviews were conducted in early 1982 when there was excess capacity in Canadian subsidiaries as well as U.S. affiliates (parents), there had been no attempt to close the subsidiaries on the grounds either that their mission was no longer appropriate or that their capacity was excess to the needs of the parent corporations. This result certainly does not support the contention that subsidiaries are closed in Canada when they have problems, or when employment in U.S. affiliates is threatened. In the sample of firms, it was the Canadian-controlled firms that were considering leaving Canada in search of locations with lower costs and more stable environment (p. 77).

Davidson and McFetridge (1984) also study the exit process of U.S. multinationals in Canada but they do not compare it with domestic firms in the same industry. They investigate the determinants of the probability of the sale or liquidation of Canadian affiliates of U.S. multinationals over the 1975-82 period.

Davidson and McFetridge find that the probability that a Canadian affiliate is sold or liquidated and its functions terminated is greater for small recently acquired affiliates operating in different lines of business than the parent. Given the characteristics of the affiliate, termination is more likely the smaller is the proportion of the parent's sales derived from foreign affiliates and the slower is the rate of growth of the parent's foreign sales.

Davidson and McFetridge results highlight a number of possible causes of exit by multinationals. These include:

- Affiliate failure – terminations are more common among small affiliates which the parent has operated for a relatively short time.

- Local rationalization – terminations are more common among affiliates which have been acquired (perhaps as part of a larger domestic merger or a parent merger) rather than newly formed or which are in different lines of business from the parent.

- Decreasing advantages of multinational organization – terminations are more frequent for affiliates with parents deriving a small or declining share of their sales from foreign affiliates.

Existing studies of the exit process and its determinants are far from definitive. Neither domestic nor foreign-owned firm exit rates are linked in the expected fashion to the fortunes of the industries in which they were operating. Two of the three cross-section statistical studies surveyed find that, for foreign-owned firms, a link of any kind between industry characteristics and the exit rate is virtually non-existent. Davidson and McFetridge results imply that parent and affiliate characteristics have a role in explaining exits.

Once these characteristics are held constant, it may be that a closer relationship between industry characteristics and affiliate exits will emerge. For the present, we must be content with the observation that exits by local firms, while not without behavioural anomalies, tend to be more closely linked to local growth rates, production conditions and tariff rates.

The Shapiro and the Baldwin, Gorecki and others' studies also examine the entry process. Shapiro finds relatively little systematic interindustry variation in entry by foreign firms. In rough terms, foreign firms appear to respond to potential profitability in the same way as domestic firms, but are less responsive to industry growth and are deterred less by any capital-intensity barriers to entry.[6] Similarly, foreign firm entry tends to be more prevalent in R&D-intensive industries and domestic entry less so.

Baldwin, Gorecki and others find that foreign firm entry by means of new plant construction is encouraged by decreases in the minimum efficient scale of production and by low advertising intensities, but not by market growth. Domestic entry is encouraged by both market growth and decreases in minimum efficient scale and is discouraged by both high advertising and high R&D intensity (1983, Table 10, p. 62).

The acquisition of existing plants by foreign firms is unrelated to market growth. Plant acquisition by domestic firms responds positively to export growth and negatively to import growth (1983, Table 11, p. 66).

In sum, these studies indicate, albeit in an extremely rough fashion, that entry by local firms tends to be somewhat more closely related to the growth experience of the domestic industry involved than is the case for foreign firms.

Factors Influencing the Proportion of Domestic Production Accounted for by Multinationals

The analysis to this point has examined both the factors which could give rise to an international redistribution of production and the possibility that the pattern of locational adjustment could vary between foreign- and domestically owned firms. The analysis in this section investigates the factors which could give rise to a change in the proportion of domestic production accounted for by multinationals over the long term. In this case, there is no shift in production. It is simply that foreign firms account for a different fraction of it. Moreover, the change in multinational participation we are concerned with here is not transitory, based, perhaps, on a different rate of adjustment to changes in local conditions. The concern here is with long-term changes in multinational participation in the local economy.

There have been a number of studies which have attempted to explain either intercountry or interindustry differences in the proportion of local production (employment, exports) accounted for by multinational enterprises. These are well summarized in Caves (1982) and, more recently, in Teece (1986). There has been relatively little effort devoted to the analysis of changes in the extent of multinational participation in various industries and/or countries over time. The discussion here focuses on this question, particularly on the factors associated with the exit of multinational enterprises from a particular country, say, Canada.

A literature on multinational disinvestment has begun to emerge (see, Dunning, 1988, for references). Much of this literature is taken up with the examination of specific investment projects and why they failed or why multinational involvement was terminated.

The discussion in this section is of a more general nature. The disinvestment literature has not, until recently, distinguished between failed investments and investments which are fundamentally sound but in which multinational ownership participation is itself unproductive. The purpose here is to examine the circumstances under which the rationale for affiliation by means of majority ownership disappears.

There are two basic reasons for a decline in the proportion of production accounted for by multinationals. The first is a decline in the relative importance of what have been called firm-specific public inputs in the production process. These are simply inputs which can be used in all production locations simultaneously. These public inputs are also called intangible assets and ultimately involve either the knowledge or reputation which an organization has at its disposal. Caves (1982, pp. 8-12) summarizes the extensive body of empirical evidence which attests to the role in intangible assets in explaining interindustry differences in multinational participation in various national economies (for a recent Canadian study, see Meredith, 1984).

Most of this empirical work concentrates on the relationship between the importance of intangible assets and the level of multinational participation in various industries rather than changes in it. Moreover, the crude measures we have of the importance of firm-specific intangible assets such as R&D intensity and advertising intensity are unlikely to change much in relative terms over time. One of the best

indicators of the importance of firm-specific intangibles is the average number of domestic plants operated by the largest firms in an industry (see Caves et al., 1980, p. 86). Examination of published Canadian data which, due to suppressions to maintain confidentiality, involves the average number of plants operated by the largest eight firms shows that, between 1973 and 1982, the changes were small and not statistically significant.

It remains possible, however, to provide examples of situations which would involve a decline in the importance of firm-specific intangibles. One example would be the increased importance of so-called generic brands especially in food retailing. These are not really generic. It is simply that quality certification lies in the hands of the retailer rather than the manufacturer. The rents to manufacturers' brand names are reduced and we ultimately expect both fewer of them and fewer international transfers of them.[7]

Another example would be the apparent decline in the period of time over which new technologies remain proprietary. The faster new technologies and methods can be copied, the less there is for the innovator to sell (by means which will be discussed next) to producers in other countries. The importance of knowledge assets will also decline if the rate of technological change slows down, that is, as the industry "matures."

Given the relative importance of firm-specific intangible assets, the proportion of local production accounted for by multinationals will also decline if it becomes advantageous to transfer these assets by arm's-length means. Here domestic production continues under various sorts of license, franchise and joint-venture arrangements but the role of foreign affiliates declines.

The role of the multinational enterprise as a device for facilitating transactions in intangibles derives from the work of Williamson (1975) and was first stressed by McManus (1972). It has been the subject of numerous empirical investigations in recent years (see, for example, Davidson and McFetridge, 1984, 1985 and McFetridge, 1986).

For present purposes, the important issue is whether there are forces at work to increase the relative advantage of arm's-length transactions and, if so, in what industries and to which countries. Obviously there are many cases in which local ownership restrictions are such as to require arm's-length (or, at most, joint-venture) transactions in intangible assets (see Safarian, 1983). The incidence of these restrictions tends to be greater in less-developed countries so that a shift of production from developed to less-developed countries would also result in a decrease in the relative importance of multinationals.

Parties who are free to choose among alternative means of transacting are more likely to opt for arm's-length exchange, the more routine or well-defined is a transaction and the smaller is its value. These circumstances are likely to arise when the qualities of the assets involved are relatively well-known and there are substitutes available both as benchmarks to which the transacting parties can refer and as alternatives to which they can turn or threaten to turn in the event of dispute. Again, this situation might be characterized as involving a mature, large numbers industry. It is preferable, however, to think in terms of specific assets rather than broadly defined industries which may, at any point in time, contain segments in which arm's-length transactions are, respectively, less and more advantageous.

Whether it is due to a decline in the relative importance of firm-specific intangible assets or to a decrease in the relative cost of transferring them at arm's-length (or both), the resulting decrease in the relative importance of multinationals in the industries concerned should be global in nature. That is, it should not affect the international distribution of production within multinationals over the longer term.

There are, however, reasons to believe that the benefits of multinational organization will not be the same and will not change at the same rate in all countries. The role of firm-specific intangible assets may vary across countries. For example, continued reliance on manufacturers' brands as certification devices may be profitable in some countries and not in others. Similarly, it is possible, even in the absence of regulatory restrictions, that the preferred mode of transacting could vary across countries at a given point in time. More prosaically, even if conditions warrant a proportional decline in role of multinationals in all countries, the process is likely to occur at a different rate in each country thus involving changes in national shares at least over the short term.

The essential conclusion is that, viewed from a local perspective, exit by multinationals may reflect either a deterioration in local production conditions or a decrease in the advantages of multinational ownership of local production or both. On occasion, exit may appear to involve a lack of commitment to still viable local production. The point made here is that it also reflects a recognition that, at certain stages in their evolution, certain productive activities can be carried out more efficiently under local ownership.

3 Organizational Adjustment by Multinationals

The Analytical Framework

Changes in the organization of production can be analysed at a number of different levels. In Chapter 2, factors associated with changes in the relative importance of multinational enterprise itself were discussed. Multinational enterprise can be viewed as the endpoint on a continuum of possible international linkages among producers. A decline in the relative advantages of the multinational form will cause a movement along this continuum in the direction of admitting local partners, joint venturing, taking a minority interest and ultimately licensing or ceasing to trade in intangibles together. It was suggested that this will occur in different countries and/or industries at different rates and need not involve a continuous movement in one direction.

In this section, the focus is on the types of organizational change within multinationals, that is, holding ownership structure constant. Of particular concern are the changes in the market environment which might be expected to induce organizational change.

Organizational change within a firm may involve either or both administrative structure or production arrangements themselves. The emphasis here is on production arrangements.

Insofar as administrative structure is concerned, the principal concern in recent years has been with the degree of discretion accorded management of local affiliates by the parent. Recent Canadian discussion has focused on the administrative arrangements which are best suited to facilitate the specialization of local production activity. The merits of product mandates and specialization agreements have been debated extensively (see Crookell, 1985, 1987; Daly and MacCharles, 1986).

The evaluation of alternative multinational administrative structures has yet to yield much in the way of systematic conclusions. The first reason for this is that affiliate strategies and structures are difficult to categorize. Thus the strategy of Canadian General Electric calls for specialization in particular stages of production of various product lines as well as product mandates (all stages of a single product line) and joint venturing to exploit CGE's accumulated technological capabilities (Abel, 1984). Here is an example of a firm making use of product mandates and specialization agreements and diversifying simultaneously. Strategies and the structures that facilitate them are likely to be highly idiosyncratic.

Second, to the extent that they can be characterized, it is difficult to compare the performance of alternative administrative structures. For example, Davidson (1984) compares the growth of multinationals with differing organizational characteristics but is unable to hold other determinants of growth constant.

The existing literature is far from establishing systematic links between environmental characteristics (technology, factor prices, trade policy) and organizational design. It does convey the impression, however, that increases in trade and in rates of technological change have induced a movement away from the polar cases of dependent and independent affiliates toward interdependence (Bartlett and Ghoshal, 1987). In an interdependent system, each affiliate draws on the resources of the parent and other affiliates and is, in turn, drawn upon by them. Rather than having product mandates, affiliates will have knowledge or know-how mandates.

With respect to the production process itself, recent discussion has focused on the so-called rationalization of production. Rationalization is often associated with specialization. Specialization can be horizontal or vertical. Horizontal specialization involves a reduction in the number of product lines produced in a single plant. Horizontal specialization could also involve a reduction in the number of product lines either produced or sold by a firm. Vertical specialization involves a reduction in the number of stages of production carried out either in a single plant or within a firm.

Horizontal and vertical specialization can occur purely within the context of the domestic market. Individual firms may sell a variety of products but specialize in a few stages of production of a few product lines. Specialization among unaffiliated firms may encounter contract specification and enforcement problems. If the costs of transacting outweigh the benefits of specialization, potential production economies will go unrealized.

If specialization is allowed to occur within the context of an international market, further economies are likely to be realized for three reasons. First, the domestic market may have been so small that even full specialization (i.e., single plant and product) leaves plant scale and run-length economies unexhausted. Second, specialization arrangements can be made between domestic firms and foreign affiliates thus avoiding the costs of arm's-length arrangements. Third, in an international context with a larger number of potential partners, arm's-length specialization agreements may also become less costly.

International rationalization involves specialization by local plants, in particular product lines or stages of production. Intermediate goods and/or end-products (for resale) are provided by plants located abroad. A manifestation of this type of specialization is an increase in intraindustry trade in either intermediate goods (in the case of vertical specialization) or finished goods (in the case of horizontal specialization).

Local manifestations of international specialization will include decreases in plant value-added/shipments ratios if specialization is vertical, and decreases in the number of product lines per plant if specialization is horizontal.

Rationalization need not involve specialization. Rationalization is simply the adoption of production techniques and arrangements which minimize cost, given the available technology, input prices, taxes, transportation costs, tariffs and other trade restrictions. Given the trade policy environment, changes in technology may increase or decrease the optimal degree of horizontal and vertical specialization by local producers.

The optimal degree of specialization depends fundamentally on the relative magnitudes of plant-specific, product-specific, and stage-specific fixed costs. Transportation cost is another important factor. The role of uncertainty is generally overlooked and it may also be important.

The greater are plant-specific relative to product- or stage-specific fixed costs, the smaller are the potential gains from specialization. Note that it is the existence of *product*-specific fixed costs at the *plant* level which generate economies of horizontal plant specialization.

The relative magnitudes of plant-specific and product- and stage-specific fixed costs depend on both technology and factor prices. For example, Gold (1982) and Goldhar and Jelinek (1983) argue that advances in CAD/CAE/CAM have reduced set-up or change-over costs thus reducing the advantage to be derived from plant specialization. As the discussion in Chapter 2 indicated, technological change may also increase the separability of successive stages of production. This will increase the potential benefit from vertical specialization with the possible implication that labour-intensive stages of production are transferred offshore.

A change in relative factor prices can also change the optimal degree of specialization. For example, if the set-up or change-over process is relatively labour-intensive, then an increase in the real wage can increase the benefits of plant specialization (Harris and Cox, 1984, p. 87).

Technological change on the product side may increase the optimal breadth of a firm's product line. Home audio equipment (phonographs, tape decks, CD players, etc.) may be an example. Depending on the feasible production arrangements, the consequence may be a decrease in plant specialization.

Given the variety of products demanded, product differentiating activity can be carried out at various stages in the production-distribution chain. For example, quality characteristics may be certified by either or both retailers' or manufacturers' brand names. If branding occurs at the retail level, it will be less costly for manufacturers to specialize. Retailers provide full lines under their own brand (Sears, for example). Each line is (or may be) provided by a specialized manufacturer. The relative importance of this phenomenon may vary from industry to industry, across countries and over time.

Specialization arrangements between unaffiliated manufacturers which might not be feasible in the early stages of a product's life cycle may become so as the product matures. A possible example is the large electrical appliances industry in which considerable specialization among domestic manufacturers has occurred in recent years (Crookell, 1985).

Both optimal scale and specialization may depend on the degree of uncertainty which exists regarding the demand for the industry's products. Carlsson (1986) cites a considerable body of literature to the effect that greater uncertainty regarding demand has the effect of reducing optimal plant scale. It can further be conjectured that uncertain demand increases optimal product diversity at the plant level (to the extent that demands for individual product lines are less than perfectly correlated).

The degree of demand uncertainty may change over the product cycle. Mariotti and Cainarca (1986) argue that in the textiles and clothing industries, innovations in supply-

ing industries (man-made fibres and dye stuffs) and in marketing have increased uncertainty over the entire product cycle. The response among Italian producers has been to increase the range of textiles or clothing product lines they can produce. This increase in product diversity has made successive stages of production less compatible so that vertical disintegration has also occurred.

For a given product at a particular point in time, the degree of demand uncertainty depends on the size of the market and on transportation costs. If the demands of individual buyers are less than perfectly correlated, the variation in market demand around its average or trend value should decrease as the size of the market increases. This may help to explain why survivor estimates of optimal plant scale are generally lower than engineering estimates. It implies that the divergence between the two should be greater in smaller markets. This provides an alternative but, as yet, unexplored reason for the apparent inefficient scale and excessive product diversity of Canadian manufacturing plants. It also implies that by expanding the size of the market to which Canadian firms have access, trade liberalization may reduce uncertainty thereby encouraging further specialization.

To summarize, given the trade policy environment, optimal scale and specialization will depend on factor prices, the product technology, production and distribution technologies and on the degree of uncertainty. These factors are largely industry-specific and there is no reason to expect them to change in a similar fashion across industries.

A change in the trade policy environment, specifically trade liberalization, can be expected to result in a rationalization of domestic production if the latter had been limited by the size of the domestic market. As was suggested above, trade liberalization opens up the possibility of intrafirm rationalization with affiliates abroad and may also reduce the cost of arm's-length specialization arrangements.

Although its plausibility has been questioned (Muller, 1982), the most widely cited link between trade liberalization and the rationalization of production is what has become known as the Eastman-Stykolt (1967) hypothesis. The latter maintains that Canadian manufacturing industries operate as open (free entry) cartels which price to the tariff. Entry occurs until the average cost of domestic producers is just equal to the landed price of competing foreign goods. In this model, domestic specialization arrangements are senseless because free entry always drives domestic unit costs up to the landed price of foreign goods. Similarly, a reduction in foreign tariffs cannot, by itself, effect a reduction in domestic unit costs. Thus the Eastman-Stykolt model, at least as operationalized by Harris and Cox (1984), assigns a crucial role to the domestic tariff. Its reduction is necessary and sufficient to induce domestic rationalization. Tariff policy is a substitute for both competition policy and industrial policy.

In sum, there are two quite different models of the relationship between trade restrictions and the organization of domestic production. One model implies that domestic production is efficient within the limits on specialization imposed by domestic and foreign tariffs. Domestic prices reflect local production costs and may, as a consequence, be well below the landed price of competing foreign goods. Trade liberalization increases the potential for specialization both directly and indirectly by reducing uncertainty. A domestic tariff reduction facilitates rationalization but is not needed to induce it.

Under the Eastman-Stykolt alternative, the level of the domestic tariff (given the terms of trade) determines domestic unit costs, and only a reduction in the domestic tariff can ensure a permanent unit cost reduction.

In order to isolate the factors which determine the magnitude and nature of rationalization resulting from trade liberalization, we examine the consequences of Canadian and foreign tariff reductions in the Harris and Cox (1984) general equilibrium trade model of Canada. In this model, Canadian manufactured goods compete with imports in the domestic market and are also exported. Their price in the domestic market depends partly on the landed price of competing imports and partly on a mark-up over variable cost. Their price on foreign markets is the Canadian price plus the foreign tariff.

A unilateral cut in Canadian tariffs reduces the landed price of imports. Canadian producers respond by reducing the prices of import-competing goods. This price reduction carries through into the market for Canadian exports.

The reduction in the price of imports increases Canadian demand for them. Some of this increase takes the form of substitution away from import-competing goods. The reduction in the price of import-competing goods increases demand for them. There is also an increase in export demand.

The net effect of the unilateral tariff reduction on Canadian manufacturing output is greater (i.e., more positive): a) the less substitutable are imports and import-competing goods; b) the more elastic is the demand for import-competing goods; and c) the more elastic is the demand for Canadian exports.[1]

To break even at the lower price of import-competing goods, domestic producers must reduce their average costs. Average cost is reduced in this model by economizing on fixed cost. This can be achieved by increasing output per plant. The required increase in output per plant is smaller the more important are fixed costs, that is, the greater are the potential scale economies.[2] Given the growth in demand for an import-competing good, the required net exit rate (proportion of plants which must cease production) is lower, the greater are the potential scale economies.[3]

Rationalization need not involve either an increase in output per plant or exit.[4] It can take the form of economizing on product- or stage-specific fixed costs. This implies dropping product lines or concentrating on fewer stages of production and producing more of the remaining lines or at the remaining stages.

The required reduction in unit cost is likely to be achieved by some combination of exit and specialization by either product line or stage of production. The role of exit should be greater the more important are plant-specific relative to product- or stage-specific fixed costs.

If fixed costs are also sunk, that is, not avoidable by closing a plant or dropping product lines, then there is no immediate rationalization in this model. The pace of rationalization depends on the speed at which fixed assets decay. If plant-specific fixed costs are sunk but product-specific fixed costs are not, product lines will be dropped but there will be no exit and *vice versa*.

A multilateral tariff reduction results in a further increase in the demand for Canadian exports. Since the required reduction in unit cost continues to be determined by the height of the Canadian tariff, the expansion of production for export serves to reduce the amount of exit or specialization by product or stage of production required to break even.

The Harris-Cox model thus has the testable implications that a decline in domestic tariffs increases imports, exports and the (net) exit rate. The increase in the exit rate should be greater the smaller are potential scale economies and the greater is the existing degree of plant specialization. The exit rate should fall as foreign tariffs are reduced and this decrease should be larger the smaller are potential scale economies and the greater is the existing degree of plant specialization. While they deviate in many respects from the specification Harris-Cox reasoning would say is appropriate, the existing statistical studies of exit rates surveyed in Chapter 2 do not confirm these predictions.

The rationalization scenario developed above does not distinguish between domestic and multinational firms. A number of possible distinctions have been suggested. The first set involves differences in price pressures. The second set turns on differences in cost characteristics.

One possibility suggested by Caves and Williamson (1985) and Williamson (1986) is that multinationals inhabit a segment of the market characterized by greater product differentiation. This differentiation serves to attenuate the influence of the landed price of imports on the pricing decision. A tariff reduction would therefore have a smaller effect on both prices and output than in segments of the market characterized by less product differentiation.

Suppose that tariff cuts do have a more modest effect on prices and output in the market segments frequented by multinationals. What significance has this for rationalization? If the Harris-Cox interpretation of the Eastman-Stykolt hypothesis is adopted, the conclusion is that multinationals will engage in less rationalization than domestic firms. As argued above, this interpretation holds that free entry drives unit cost up to equal the product price. In the absence of downward pressure on price, firms will either not avail themselves of opportunities for rationalization or if they do, their efforts will be undone by new entrants.

The alternative model, which is more consistent with the product differentiation, holds that benefits of rationalization are not offset by new entry and opportunities for rationalization are exploited regardless of price pressure in the product market. Under this alternative, the existence of multinationals does not influence the rationalization induced by a tariff reduction. The response of the farm machinery industry to the elimination of Canadian and U.S. tariffs tends to support this alternative. The multinationals combined market segmentation (implying higher prices in North America) with a thoroughgoing program of plant specialization (Globerman, 1988).

On the cost side, it could be argued that since it may already be incurring plant- and product-specific fixed costs abroad, a multinational can rationalize its product lines internationally at lower cost than a domestic firm. A domestic firm would not be placed at a disadvantage, however, if it could readily form relationships with existing foreign producers of if there were no penalty for offering a narrower range of products to buyers.

It may also be the case that multinationals have already acquired "large market" or long production run know-how while domestic firms have not (Markussen, 1985, p. 144).

Specialization would again be more costly for domestic firms as a consequence.

The "short-line" know-how of Canadian-based producers need not become redundant as a consequence of specialization. Specialization in short-line production for North American or possibly global markets may itself be profitable. Erdilek (1986) finds that some Canadian subsidiaries already have this mandate. In this case, trade liberalization could lead to some Canadian plants becoming smaller or more diversified. This would not be a failure to adjust although it may be perceived as such by academic and other observers. It should be kept in mind that process specialization is potentially as efficient as product specialization, and know-how mandates as valuable as product mandates.

Rationalization in Practice

In their analysis of the determinants of changes in the scale of Canadian plants (relative to U.S. plants in the same industry) over the 1970-79 period, Baldwin and Gorecki (1983*a*, Table 12) find that: (i) relative scale declines as import penetration (imports/domestic disappearance) increases; and (ii) relative scale increases as net trade balance and domestic market size increase. They also find that, given these factors, a decrease in effective tariff rates increases relative plant scale but only in high tariff, high concentration, high foreign ownership industries.

These results are in partial accord with predictions regarding the consequences of trade liberalization derived in the first section of this chapter. Holding the amount of trade constant, a decrease in the effective tariff rate increases relative plant scale in the most protected industries. Working in the other direction, however, is the accompanying increase in trade (i.e., more imports, more exports). As a consequence, relative plant scale falls unambiguously in the industries which had not been highly protected (in 1970) and may also fall in the industries operating with above-average protection and seller concentration in 1970.

Trade liberalization apparently does not increase plant scale in general. Whether scale actually declines or the proportion of production carried out in submarkets characterized by smaller optimal plant scales increases is another unanswered question.

With respect to differences in the response of foreign and domestic firms to trade liberalization, the results are clear. There is no difference in the scale responses of foreign- and domestically owned plants.

If trade liberalization does not increase plant scale, then it must result in plant specialization. If it does neither, then either Canadian producers have not rationalized (eliminating most of the potential gains from trade liberalization) or rationalization involves something other than plant scale and product line specialization, as measured by Baldwin and Gorecki.

With regard to product line (horizontal) specialization, Baldwin and Gorecki (1983*b*, Table 26) find that a decrease in effective tariff protection was associated with an increase in average production run length over the 1975-79 period. The implication is that while plant scales may have declined, product diversity declined proportionately more. Again ownership makes no difference.

A more recent study of product line specialization has been conducted by Balcombe (1985). The latter finds that of 254 firms exporting from Canada, 14 per cent reported that, over the 1979-83 period, they had narrowed the range of products produced in their Canadian plants while 43 per cent had broadened it (see Table 3-1). Foreign- and domestically owned firms behaved in a virtually identical fashion. Small firms and major exporters were the least likely to have specialized.

Additional information on both horizontal and vertical specialization is reported by MacCharles (1983) and Daly and MacCharles (1986). These authors found that of the 15 Canadian-owned firms in 15 different industries surveyed in 1982, nine were specialized by product or were specializing. Of the 15 matched (same industry, same number of employees, less than 400) foreign-owned firms, five were specialized or were specializing. The remaining firms were either leaving the industry or not changing their operations (1986, p. 41). The authors conclude from their analysis that:

> . . . the subsidiaries are still predominately import competers . . ., had slower growth in their exports in the latter part of the 1970s than firms in the Canadian sector of control and were slower to increase scale and specialization in response to the changing trade environment than their counterparts in the Canadian sector (1986, p. 74).

Daly and MacCharles advance several explanations for their finding that affiliates have adapted relatively slowly to changes in the trade environment. The first is that subsidiaries were more specialized and export-oriented initially than Canadian firms and thus had less adapting to do. The second reason is that the management of subsidiaries found it relatively difficult to take the required entrepreneurial initiative (p. 75). It is apparently difficult for affiliate management to convince parent management to change

Table 3-1

Comparison of Current Product Line Range with that of Five Years Earlier

		Product line range (% of respondents)		
	Number of firms	Narrower	Broader	Same number of lines
Size				
Small	78	4	54	42
Medium	95	18	39	43
Large	81	20	38	42
Trade commodity classification				
Food products	22	14	45	41
Fabricated materials	73	14	33	53
Finished products	159	14	48	38
Control				
Canadian	173	14	44	42
Foreign	81	15	42	43
Export orientation				
Modest	60	17	38	45
Moderate	90	17	43	40
Major	73	5	55	40
Total	254	14	43	43

SOURCE: See Balcombe (1986), Table 8.

strategies and especially to allow affiliates to specialize. As the analysis in Chapter 2 suggests, this is a consequence of the parent strategy of maintaining diversified sources of supply. It might be conjectured here that the incidence of affiliate specialization is likely to be greater when system demand is sufficient to support two or more specialized affiliates operating in different jurisdictions. Regardless of scale benefits, a parent is likely to be reluctant to rely on one affiliate to supply system-wide requirements of an idiosyncratic product.

With respect to vertical specialization, MacCharles (1983) reports that, within the group of industries characterized by a high proportion of intraindustry trade, the ratio of purchased materials to value added increased for Canadian-owned firms over the 1974-79 period (from 1.56:1 to 1.73:1), while the reverse was true of foreign-owned firms (1.89:1 to 1.61:1). He concludes that Canadian-owned firms are specializing vertically, while foreign-owned firms are not.

Lazar (1986, Table 5) reports value-added/shipments ratios (for the two-digit SIC industries) for 1970 and 1980. Canadian-owned plants have lower value-added/shipments ratios, implying either greater vertical specialization or concentration at a later stage of production than U.S.-owned plants in eight of ten industries in 1980. The average value-added/shipments ratio of Canadian-owned plants declined relative to U.S.-owned plants in seven of ten industries over the 1970-80 period. This may imply a greater tendency toward vertical specialization among Canadian-owned plants in these industries. The opposite tendency was observed in the pulp and paper, machinery and transportation equipment industries.

Case study evidence on the response of both multinationals and domestic firms to past instances of trade liberalization has been surveyed by Wolf (1986) and Globerman (1988). The case study evidence is limited in coverage and detail and is, in some cases, contradictory. Product specialization usually occurs unless prevented by non-tariff barriers or strong local preferences, but it often takes a long time. There is little in these studies to indicate whether smaller countries participate proportionately in the rationalization process or whether there is any one class of firms which responds more readily or more effectively to its new environment.

It must be concluded after examining this literature that, while economists believe instinctively that trade liberalization and some form of specialization go hand in hand, confirming this empirically is a difficult task. Specialization occurs in many dimensions (product, process, type of input) and is influenced by many factors (relative prices, technology, risk). Existing empirical work has focused on only one dimension of specialization and has been unable to hold the effects of changes in the environment constant. It often covers a relatively short period (five years in the Baldwin-Gorecki product diversity study and in the Balcombe study) which, if the case study evidence is correct, may be insufficient to reveal long-term trends. Some measures of specialization are themselves suspect. The value-added/shipments ratios, for example, can vary for a number of reasons unrelated to changes in vertical specialization. Given these qualifications, the published evidence tends to indicate that trade liberalization has induced product specialization by both multinational and domestic firms.

Trade Liberalization and the Organization of Production: Intended Future Responses

Evidence regarding actual responses to past instances of trade liberalization can be augmented and qualified by surveys of intended responses to proposed future trade liberalization. The results of three recent surveys regarding the anticipated effect of free trade between Canada and the United States on both Canadian firms and Canadian affiliates of U.S. multinational enterprises are summarized in this section.

Erdilek (1986) surveyed 28 U.S. multinationals with majority-owned affiliates in Canada. He asked four questions, two of which are of relevance here: (i) how would a free-trade arrangement affect the flow of goods and services between your parent firm and your Canadian affiliates?; and (ii) how would you change the scale and structure of your Canadian affiliates' operations as a result of a free-trade arrangement?

Erdilek finds that, with regard to the first question:

> Most respondents indicated that since on their products the Canadian tariffs were generally higher than the U.S. tariffs – and the Canadian prices were above the U.S. prices – FTA would stimulate bilateral (both intra-firm and inter-firm) exports from the parent more than those from the subsidiary. This response was qualified by the importance of shipping costs, product differentiation . . . local servicing required by the markets . . . (pp. 33 and 34).

Respondents also indicated that a free-trade arrangement would tend to stimulate intermediate good rather than finished good exports. The implication is that increasing specialization will be vertical (i.e., by stage of production) rather than horizontal (by product line).

With respect to the scale and structure of Canadian operations, Erdilek finds:

> The consensus revealed, as expected, the current suboptimal scale and structure of most branch plants that were not covered by APTA (the auto pact). They were not only too small and old but also manufactured too many product varieties for the limited local market with too short production runs. They had in general higher unit costs and lower quality relative to their parents. Their inefficiency made them globally uncompetitive and also would make them initially uncompetitive in an integrated free North American market (p. 37).

While some respondents indicated that their Canadian operations were already efficient by North American or world standards, the dominant view was that free trade would force either rationalization or exit (p. 40). Two related and noteworthy findings are that without free trade, a number of Canadian affiliates would have been closed. Free trade opens a rationalization option. Second, even after rationalization, the Canadian affiliates would, in at least some cases, remain a low volume, specialty producer (p. 44).

Lazar (1986) surveyed 102 companies representing 12 per cent of employment in 10 Ontario industries. Twenty-one per cent of these companies had taken the possibility of free trade into account in their planning process.

Although fewer than 15 companies answered the question, Lazar notes that these companies ranked "avoiding tariffs" as the second most important factor (after "market access" and almost equal with "contact with buyers') in the decision to *establish* a plant in Ontario. He interprets this as support for the argument that free trade would result in repatriation of Ontario employment by U.S. companies (pp. 42 and 43). An alternative interpretation is that while tariffs may have provided an incentive to establish a plant in Ontario, their elimination need not induce exit. This is especially true if Canadian affiliates have acquired production expertise or other specialized assets in the course of their operations.

Lazar asked the companies to project their Ontario employment to 1995 with and without a "best case" and a "worst case" free-trade arrangement. He finds for the average of the best and worst cases, Ontario employment would be 7 per cent lower over all and 16 per cent lower in foreign-controlled companies in 1995 with free trade than without it (p. 48). Lazar's best and worst cases are, respectively, concessions by the United States but none by Canada and concessions by Canada but none by the United States. The average of these two is not the same as a bilateral free-trade arrangement involving simultaneous concessions by both the United States and Canada. Thus the free-trade question was not posed.

Finally, companies were asked to rate the effects of a free-trade arrangement (of their own construction) on their output levels in Ontario. Forty-eight per cent of foreign companies rated as beneficial as did 42 per cent of Canadian companies. Thirty-one per cent of all firms said it would be harmful and 24 per cent neutral (p. 50). Foreign-owned firms tended to be more optimistic about the effect of freer trade on their level of production in Ontario than Canadian-owned firms. The most pessimistic group appears to be small- and medium-sized Canadian-owned firms. Of

course these differences in attitude toward freer trade may be due as much to the line of business and perhaps other characteristics of the respondents as to their size and ownership.

Rugman (1987, 1988) surveyed 16 Canadian-owned multinationals and 10 Canadian affiliates of U.S. multinationals regarding the respective effects of a Canadian-American free-trade area and a multilateral trade agreement on their Canadian output employment and investment. Three-quarters of the Canadian firms and all of the U.S.-owned firms anticipated that Canada-U.S. free trade would benefit their firm (1987, p. 86). Adjustment costs appear to be greater for the U.S. affiliates but both groups anticipate that these costs can be readily absorbed. A large majority of each group anticipates that employment would either remain unchanged or grow as a result of Canada-U.S. free trade (pp. 86 and 87). Professor Rugman concludes from his survey that: 1) multinationals can bear the costs of adjustment themselves; 2) there will be few plant closures; 3) bilateral trade and investment will both increase; and 4) these large firms will continue to prosper (p. 85).

Taken together, these surveys imply that:

- Trade liberalization generally induces a positive response, that is, specialization of some sort rather than exit.
- Adjustment may be more costly for small- and medium-sized Canadian firms and some affiliates of multinationals which have heretofore confined themselves or been confined to the Canadian market.
- Trade liberalization mitigates adjustment problems raised by changes in both technology and global trading patterns.

The surveys, together with the evidence on responses to past instances of trade liberalization, further imply that:

- It is very difficult to generalize regarding the nature of the specialization that trade liberalization has induced or might induce in the future.
- A crude generalization is that Canadian producers have not attempted to and do not intend to compete by exploiting all available economies of large plant scale or large batch size. The approach adopted by both foreign and domestic firms appears to be one of "niche-playing" or exploitation of small batch/small market know-how. Multiple sourcing by multinationals reinforces this tendency.
- Trade liberalization has not resulted in and is not expected to result in an appreciable increase in plant closures by either foreign or domestic firms.

4 Measuring Locational and Organizational Adjustment Using Surveys of U.S. Foreign Direct Investment

The U.S. Department of Commerce annual and benchmark surveys of U.S. foreign direct investment provide information on the employment, sales, exports, assets and plant and equipment investment of majority and minority subsidiaries of U.S. corporations, by country and industry, for the years 1966, 1977, 1982, 1983, 1984 and 1985, preliminary (U.S. Department of Commerce, 1975, 1981, 1985, 1986*a*, 1986*b*, 1987*a*, 1987*b*). Information on U.S. parents is also provided for the years 1977-85. The degree of detail differs from year to year and there are a number of suppressions for confidentiality reasons. Nevertheless, these data are more timely and detailed than the alternatives (see, for example, the United Nations Survey of Industrial Production, 1985).

Inferences regarding shifts in the location of production can be derived from these data by comparing the proportion of the employment, sales, exports of investment of all parents and affiliates in a particular industry accounted for by affiliates in various countries over time. Comparisons of this nature raise two questions. First, which of employment, exports, etc., is the best measure of productive activity? (This question is addressed in Chapter 5.) Second, what shifts in the international distribution of production within multinationals (or at least within the group) imply about the attractiveness of a particular country such as Canada as a production location?

Consider first a situation in which the proportion of parent plus affiliate (system) exports accounted for by Canadian affiliates declines. This need not imply a decrease in Canada's share of world exports of the commodity in question. There may be an offsetting increase in exports by other Canadian producers. By itself, then, a decline in the Canadian affiliate share of system exports implies only that Canada is a less attractive location to U.S. multinationals as a group. To draw inferences regarding the attractiveness of the Canadian location in general, additional information is required (see note 3, Chapter 5).

Suppose now that the share of Canadian exports accounted for by affiliates of U.S. multinationals declines. This need not imply that these firms view Canada as a less attractive production location. The relative importance of U.S. multinationals may have declined in all countries, leaving the share of Canadian affiliates in system exports unchanged.

Inferences regarding changes in the organization of production can be derived from changes in affiliate export propensities and in various proxies for scale and specialization over time. Again the comparison is between affiliates in various countries rather than between affiliates and local firms in one country. Thus it can be determined whether Canadian affiliates have specialized to a greater degree than affiliates in other countries. It can be argued that this is the more appropriate performance benchmark.

It might be asked whether the locational and organizational adaptation of U.S. multinationals is of sufficient economic importance to merit this much attention. The continuing importance of U.S. subsidiaries operating in Canada has been widely documented. This group accounted for approximately 35 per cent of manufacturing shipments in 1981.

On a global basis, the share of U.S. multinationals in world trade in manufactures remained constant at just under 18 per cent between 1966 and 1983 (see Table 4-1). While a constant export share need not imply a constant share of value-adding activity (see note 1, Chapter 5) the evidence is that U.S. multinationals continue to be a significant factor globally.

Table 4-1

U.S. Parent plus Majority-Affiliate Exports, as a Percentage of World (Market Economy) Exports, 1966-83

	1966	1977	1982	1983
Food and kindred products	7.8	7.5	8.1	9.3
Chemical and allied products	22.8	22.9	25.4	24.6
Primary and fabricated metals	8.4	7.9	7.9	6.4
Machinery	25.4	23.0	23.4	20.8[1]
Non-electrical machinery	..	23.7	22.7	20.6[1]
Electric and electronic equipment	..	22.0	24.5	21.5[1]
Transportation equipment	35.9	31.4	28.2	32.4[1]
Other manufacturing	10.9	10.8	10.3	9.8
All manufacturing	17.8	17.6	17.7	17.7

1 Estimates derived from U.S. Department of Commerce (1986*a*), Tables 35 and 57; and Statistics Canada, special tabulations.

SOURCE Lipsey and Kravis (1986), Appendix Table U-7.

5 International Shifts in the Location of Production

Introduction

The purpose of this chapter is to measure and describe the international redistribution of production by U.S. multinationals over the 1966-84 period. There are a number of possible measures of the international distribution of production. These include national shares of employment, exports, plant and equipment investment, assets, sales, etc. Each measure has its advantages and disadvantages.

The measures relied upon most heavily in this study are national employment and export shares. Employment shares have the advantage of being available for a broad industry-country cross-section and of being unaffected by currency fluctuations. National employment shares have the disadvantages of being less sensitive than, say, national investment shares, to shifts in locational advantage and of not necessarily reflecting the international distribution of value added. Countries with above-average productivity growth can increase their respective value-added shares while experiencing a reduction in their employment shares.

National export shares are affected by currency fluctuations and are available on a more restricted basis than employment shares. Moreover, a change in national export shares does not necessarily imply a change in the international distribution of production which also depends on the growth of domestic markets. Nevertheless, trade measures are often used as gauges of national competitiveness or the attractiveness of local production, and it is also prudent to have a benchmark against which employment share measures can be evaluated. For these reasons, the international redistribution of export shares by U.S.-based multinationals is also examined.[1]

The international redistribution of production can be analysed from a number of different points of view. One is concerned with the characteristics of countries that have experienced changes in their respective shares of production within relatively broad industry groups. The analysis of employment shifts with an emphasis on country detail is presented in the next section.

Another approach emphasizes industry rather than geographic detail. It is concerned with the characteristics of industries in which there have been relatively large shifts of, say, employment between U.S. parents and all foreign affiliates or between developed and less-developed countries. A variant of this approach is of special interest to Canadians. It focuses on employment shifts between Canada and the United States and/or developed countries. The next two sections describe the analysis of industry orientation and of the characteristics of the industries in which Canadian affiliates have lost or gained employment share relative, first, to U.S. parents and, second, to other affiliates. In the latter case, multiple regression analysis is employed to explain interindustry differences in the change in the employment share of Canadian affiliates over the 1977-84 period.

In the following section, the relationship between U.S. multinational and total employment shifts is investigated. The purpose of this investigation is to determine whether, on average, national rates of change of employment in a particular industry are greater or less than, or even in the same direction as, rates of change in the employment of local affiliates. This provides additional evidence on the relative stability of local employment by multinationals.

The examination of changes in the geographic distribution of production concludes with an analysis of changes in the proportion of the exports of U.S. multinationals accounted for by Canadian affiliates. The respective implications of employment and export share data are also compared.

Geographic Characteristics of Shifts in Affiliate Employment Shares

In this section, the reallocation of affiliate employment by U.S. multinationals over the 1966-84 period is examined. The reallocation of employment between U.S. parents and foreign majority affiliates as a group is investigated in the next section.

The 1966-84 period is divided into two subperiods: 1966-77 and 1977-84. This division is more a matter of necessity than of theory in that 1977 is the year of the second benchmark survey of U.S. foreign direct investment. The

1966-77 period also corresponds roughly with the period of trade liberalization in Europe. The European Economic Community (EEC) was formed in 1967 with duties on trade in industrial products between members (Germany, Italy, France, Belgium, Luxembourg, The Netherlands) to be eliminated by July 1, 1968. Four new members (United Kingdom, Ireland, Norway and Denmark) were admitted in 1973. Tariffs on trade with and among the new members were to be eliminated by July 1, 1977. Also, in 1973, the EEC and the European Free Trade Association (EFTA), then comprised of Austria, Finland, Iceland, Portugal, Sweden and Switzerland, agreed to eliminate tariffs on industrial products by 1977.

Given the actual or anticipated participation of most of Europe in some form of free trade in industrial products soon after 1966, it is difficult to test hypotheses about the effect of trade liberalization on the distribution of production *within* Europe. It should be kept in mind, however, that expansion of the European market which accompanied the elimination of internal tariffs should, other things being equal, have made European locations in general more attractive relative to the rest of the world.

The redistribution of affiliate employment between 1966 and 1977 is summarized in Table 5-1. The salient features of this redistribution are: (i) the decline in the share of affiliate employment accounted for by Canada and the United Kingdom; (ii) the increase in proportion of employment accounted for by affiliates in Latin America, largely in Brazil, and to a lesser extent in Mexico; and (iii) the increase in the proportion of employment accounted for by affiliates in the Far East (including the Philippines, Taiwan, Malaysia, Singapore, Indonesia, Hong Kong and South Korea).

The increase in the European share of affiliate employment in the manufacturing sector as a whole is not large – only 0.7 percentage point. Excluding the United Kingdom, however, the European share increased by 3.7 percentage points (12.6 per cent) in manufacturing and 8.2 percentage points (35.7 per cent) and 10.3 percentage points (44.6 per cent) in the chemicals and primary and fabricated metals industries, respectively.

The redistribution of affiliate employment away from Canada, Australia and the United Kingdom (–28 per cent, –21 per cent and –14 per cent, respectively, in manufacturing) reflects, in part, the tendency of U.S. firms going abroad in the postwar period to establish affiliates in Canada and the United States first (see Curhan, Davidson and Suri, 1977, Chapter 2). The subsequent emergence and growth of affiliates in other countries does not necessarily imply that Canada and the United Kingdom became less competitive as production locations over this period. It may imply that long-standing advantages of other locations became more apparent to U.S. firms. This familiarity effect should, presumably, exert a smaller influence on the distribution of employment after 1977.

Insofar as specific industries are concerned, the following observations are noteworthy: (i) there was a large reduction in the Canadian employment share in finance (excluding banking) and insurance and a commensurate increase in the British share; (ii) Brazil increased its employment share in all manufacturing categories, the largest increases coming in transportation equipment, other manufacturing (textiles, apparel, wood and paper products) and chemicals; (iii) employment in the machinery industry which, over this period, includes electric and electronic equipment and non-electrical machinery, shifted markedly toward the Far East (10.2 percentage points or 276 per cent) and, to a lesser extent, Brazil and Mexico.

The redistribution of affiliate employment shares over the 1977-84 period is reported in Table 5-2. Canada's employment share declined markedly in three manufacturing industry groups (food and kindred products, primary and fabricated metals and other manufacturing) and in the petroleum and finance sectors. In the chemicals, non-electrical machinery and transportation equipment industries, the employment share of Canadian affiliates increased, while in the electric equipment industry and the manufacturing sector as a whole the employment share decrease was small especially relative to the European experience.

Europe as a whole experienced a declining share of affiliate employment in most industries, finance, food and primary and fabricated metals being the exceptions. Again most of the decrease in Europe's share occurred in the United Kingdom. Unlike the 1966-77 period, however, there was no increase in the employment share of other European affiliates to offset the British decline.

Both Latin America and the Far East experienced increased employment shares with Latin American growth being concentrated in Mexico and Brazil. Latin American employment share increases are spread across most manufacturing industries, with the exceptions of food and chemicals, while Far Eastern growth is concentrated in the electric and electronic equipment industry group.

With respect to specific countries and industries or sectors, several shifts stand out. The first is the shift of employ-

Table 5-1

Majority Affiliates' Change in Employment Share, 1966-77

	All industries	Petro-leum	Manufac-turing	Food and kindred products	Chemi-cals	Primary and fabricated metals	Machin-ery	Trans-portation equip-ment	Other manufac-turing	Finance and insurance
					(Percentage points)					
Canada	-3.6	5.7	-5.9	-2.0	-4.6	-5.7	-7.1	-5.8	-6.8	-7.8
Europe	4.0	-3.6	0.7	0.9	3.8	3.4	-5.5	2.6	4.3	3.9
United Kingdom	0.3	-12.0	-3.0	-0.4	-4.4	-6.9	-5.7	-2.4	1.8	8.1
Belgium and Luxembourg	0.2	D	-0.2	-0.2	1.2	0.7	-0.9	D	D	0.7
France	1.2	D	1.3	0.6	1.4	-1.4	0.4	3.5	1.7	-2.5
Germany	0.3	-6.1	0.4	-1.4	1.6	9.3	-0.6	D	D	-1.0
Italy	0.2	0.0	0.2	0.9	1.2	-1.4	-0.6	1.3	1.0	-2.3
Netherlands	0.4	0.1	0.4	0.5	D	4.0	0.3	D	D	1.0
Ireland	0.2	0.4	0.3	-0.1	0.5	0.2	D	D	D	D
Spain	1.1	0.0	1.3	-0.1	1.1	-0.6	D	3.7	D	0.6
Sweden	0.0	0.4	0.0	D	-0.3	0.1	D	0.1	0.0	D
Japan	-0.2	D	-0.4	0.0	-1.1	-0.2	-0.7	D	D	3.5
Australia	-0.4	D	-0.9	-0.6	-1.0	-0.9	-1.3	-1.6	-0.4	3.5
Latin America	-1.5	-4.0	3.0	-1.4	1.1	7.4	-3.3	5.9	2.1	-12.1
Argentina	-0.9	0.4	-0.9	-7.1	-0.6	-0.4	-0.1	0.2	-0.7	D
Brazil	2.6	0.2	3.1	0.3	3.5	2.8	2.5	4.9	3.9	-3.1
Mexico	0.2	0.1	0.6	-0.4	-0.4	D	1.1	D	1.0	-0.8
Venezuela	-0.5	-6.1	0.2	-0.1	0.5	0.7	D	0.3	D	D
Other Asia and Pacific	1.6	-2.5	3.5	D	1.6	-4.8	10.2	D	D	-4.2
Philippines	0.3	D	0.5	0.8	0.4	D	D	D	D	D

D Suppressed to avoid disclosure of data of individual companies.

SOURCE U.S. Department of Commerce (1975), Table K-1; and (1981), Table III.G.3.

ment in the finance (excluding banking) sector from Canada to the United Kingdom. The details are:

	1977		1984	
	Employees	Share	Employees	Share
All countries	62,560	100.0	89,800	100.0
Canada	31,380	50.2	27,900	30.8
United Kingdom	8,992	14.4	26,500	29.5

The second is the shift of affiliate employment in the electric and electronic equipment sector away from Europe and, to a lesser extent, Canada, toward the Far East and Mexico. The details are:

	1977		1984	
	Employees	Share	Employees	Share
All countries	628,779	100.0	571,700	100.0
Canada	65,045	10.3	48,000	8.4
Europe	304,334	48.4	217,100	38.0
Japan	2,650	0.4	9,300	1.6
Other Asia and Pacific	142,619	22.7	181,600	31.8
Malaysia	22,072	3.5	49,200	8.6
Singapore	24,390	3.9	26,700	4.7
Taiwan	45,864	7.3	42,500	7.4
South Korea	7,668	1.2	13,300	2.3
Hong Kong	18,359	2.9	14,500	2.5
Philippines	4,917	0.8	14,600	2.6
Mexico	34,241	5.4	56,700	9.9
Brazil	38,724	6.2	28,100	4.9

Table 5-2

Majority Affiliates' Change in Employment Share, 1977-84

	All industries	Petroleum	Manufacturing	Food and kindred products	Chemicals	Primary and fabricated metals	Non-electrical machinery	Electric equipment	Transportation equipment	Other manufacturing	Finance and insurance
						(Percentage points)					
Canada	–0.1	–2.2	–0.9	–4.1	1.1	–5.6	0.2	–1.5	6.0	–4.8	–19.4
Europe	–3.0	–6.3	–4.2	3.9	–2.0	2.0	–4.8	–10.8	–8.2	–0.4	14.5
United Kingdom	–3.3	0.2	–4.5	0.3	–2.2	–1.8	–6.8	–7.0	–6.3	–3.0	15.5
Belgium	0.2	–0.2	0.3	0.2	0.1	–0.3	1.0	0.1	D	D	–1.0
France	–0.9	D	–1.8	1.0	0.0	1.4	–1.6	–2.5	–6.6	0.1	–0.1
Germany	–0.7	–0.9	1.0	0.0	0.2	0.6	1.6	1.0	3.5	0.9	–0.4
Italy	0.2	–0.9	0.2	0.2	0.1	0.7	–0.6	–0.8	–0.2	–1.3	0.7
Netherlands	0.1	–0.5	0.1	1.2	–0.2	0.4	–1.0	–0.4	D	D	0.1
Ireland	0.3	–0.4	0.4	0.1	D	0.4	D	0.7	D	D	D
Spain	–0.2	–0.1	–0.1	0.4	0.1	0.4	0.3	–1.9	0.2	0.1	0.1
Sweden	0.0	–1.1	–0.1	D	0.1	–0.2	0.5	D	D	0.9	D
Japan	0.7	D	0.6	0.2	1.7	0.3	0.5	1.2	D	D	–0.6
Australia	0.0	D	–0.1	0.4	0.7	0.5	0.6	–0.1	D	D	0.6
Latin America	0.8	–0.3	2.2	–2.4	–1.7	3.0	2.8	3.0	2.7	3.9	1.0
Argentina	–0.1	0.2	–0.4	1.5	–1.1	0.2	–0.5	–0.3	–1.1	–0.2	D
Brazil	0.2	–0.3	1.1	3.0	–1.7	5.3	0.6	–1.3	2.1	2.3	–1.4
Mexico	1.2	–0.2	2.2	1.4	0.8	D	2.7	4.7	D	0.9	–0.2
Other Asia and Pacific	1.5	D	2.3	D	0.3	–0.9	D	8.9	D	D	3.9
Indonesia	0.1	2.1	–0.1	D	0.0	D	D	–0.3	0.0	D	D
Malaysia	0.7	0.4	1.0	D	0.1	D	D	5.0	D	0.4	D
Philippines	–0.1	D	0.4	1.2	0.0	D	0.1	1.7	D	D	D
Singapore	0.4	0.0	0.4	D	D	–0.6	2.2	0.7	D	D	D
Taiwan	0.2	D	0.3	0.0	0.0	0.4	D	0.2	D	D	D

D Suppressed to avoid disclosure of data of individual companies.

SOURCE U.S. Department of Commerce (1981), Table III.G.3; and (1986*b*), Table 46.

Industrial Characteristics of Employment Share Shifts, 1977-84

In this section, we analyse interindustry differences in shifts in employment shares between: (i) the U.S. parent and developed country (DC) affiliates and less-developed country (LDC) affiliates; (ii) the U.S. parent and all foreign affiliates; and (iii) Canadian affiliates and any of all of the U.S. parent, DC and LDC affiliates.

The first two types of comparison provide an indication of whether, and in what industries, there has been a shift of production from developed to developing countries. Trends in the respective employment shares of parents and affiliates also have implications for the discussion about the globalization of production. Some argue that U.S. multinationals have been able to maintain their competitiveness by performing an ever-increasing fraction of production offshore – both in developing and other developed countries. Others have suggested that there are compelling technological and managerial reasons for centralizing production in the United States and that recentralization is, in fact, occurring. That data presented here indicate that some centralization could be occurring largely at the expense of DC affiliates.

The third type of comparison deals with the Canadian situation. The employment data imply that Canadian affiliates, like affiliates in other developed countries, have lost employment share to U.S. parents. Canadian losses have been proportionately smaller, however, than other developed countries and Canadian affiliates appear to have fared better, relative to other affiliates, in some of the more R&D-intensive industries and in industries characterized by faster growth in trade and greater trade intensity.

Table 5-3 shows the redistribution of multinational (system) employment among the U.S. parent and DC and LDC affiliates which occurred between 1977 and 1984. The first column shows the ratio of the 1984 U.S.-parent share of system employment to the 1977 share. The parent share of system employment increased on average and in most industries over this period. The largest increases in parent employment share were in durable goods wholesaling (58 per cent), oil and gas field services (45 per cent), radio, television and communication equipment (41 per cent), and electronic components and accessories (34 per cent). The largest decreases in parent employment share occurred in crude petroleum and gas (60 per cent), and miscellaneous plastic products (21 per cent).

The second column shows the ratio of the 1984 and 1977 employment shares of DC affiliates. The system employment share of this group declined on average and in all sectors except finance, insurance and real estate. Within the manufacturing sector, the employment share of DC affiliates declined by 42 per cent in the electric and electronic equipment industry, 20 per cent in machinery, 10 per cent in transportation equipment, and 10 per cent in food and kindred products. The system employment share of DC affiliates increased in primary metals (68 per cent), other transportation equipment (32 per cent), and miscellaneous plastic products (29 per cent).

The third column shows the change in the system employment share of LDC affiliates. The weighted average (all industries) system employment share of LDC affiliates fell by 3 per cent between 1977 and 1984, while the LDC affiliates' share of manufacturing employment rose by 6 per cent. Within the manufacturing sector, large increases in the LDC share occurred in miscellaneous plastic products (123 per cent), other machinery (101 per cent), construction machinery (46 per cent), and primary and fabricated metals (45 per cent). Decreases in employment share came in food and kindred products (14 per cent), and chemicals (12 per cent).

While both DC and LDC affiliates lost employment shares to parents, DC affiliates lost proportionately more. This is shown in the fourth column. The weighted average share of developed countries in total *affiliate* employment fell by 3 per cent between 1977 and 1984 and by 6 per cent in manufacturing. Within manufacturing, DC affiliates experienced relatively large decreases in employment relative to LDC affiliates in electric and electronic equipment (20 per cent), rubber products (12 per cent), miscellaneous plastic products (13 per cent), other machinery (12 per cent), and construction machinery (11 per cent).

The prevailing pattern over this period appears to have been one of the U.S. parent and/or LDC affiliates increasing their employment shares at the expense of DC affiliates. DC affiliates lost employment share to either the U.S. parent or LDC affiliates in 33 of 42 cases (there is some double counting here). DC affiliates lost employment share to *both* the U.S. parent and LDC affiliates in 12 of 42 cases.

These results imply that there has been some centralization of the activities of U.S. multinationals over the 1977-84 period. Certainly the number of instances in which the parent employment share increased at the expense of affiliates (37 of 50 cases) is greater than the number in which the opposite (i.e., decentralization) occurred. This centralization occurred principally at the expense of DC affiliates.

The implication is that what might be termed the "developed country functions" were being centralized to the U.S.

Table 5-3

Percentage Change in Employment Shares: Parents, Developed and Less-Developed Country Affiliates, 1977-84*

	U.S.-parent share of system, 1984/77	DC affiliate share of system, 1984/77	LDC affiliate share of system, 1984/77	DC affiliate share of all affiliates, 1984/77
All industries	1.03	0.87	0.97	0.97
Petroleum	1.03	0.76	1.08	0.84
Oil and gas extraction	1.04	0.86	1.02	0.90
Crude petroleum and gas	0.40	1.30	1.77	0.83
Oil and gas field services	1.44	0.63	0.64	0.99
Petroleum and coal products	0.98	0.91	1.50	0.82
Manufacturing	1.03	0.86	1.06	0.94
Food and kindred products	1.05	0.90	0.86	1.02
Grain mill and bakery products	1.01	0.95	1.07	0.97
Beverages	1.02	0.93	0.97	0.98
Other food	1.06	0.86	0.80	1.03
Chemical and allied products	1.03	0.94	0.88	1.02
Industrial chemicals and synthetics	1.01	1.06	0.78	1.08
Drugs	1.04	0.98	0.87	1.05
Soap, cleaners, and toilet goods	1.07	0.81	1.09	0.90
Primary and fabricated metals	0.94	1.32	1.45	0.98
Primary metals	0.97	1.68	1.24	1.10
Fabricated metal products	1.00	0.94	1.36	0.93
Machinery, except electrical	1.06	0.80	1.12	0.95
Farm and garden machinery	1.09	..	..	..
Construction and related machinery	1.01	0.87	1.46	0.89
Office and computing machines	1.11	..	..	..
Other machinery, except electrical	0.99	0.92	2.01	0.88
Electric and electronic equipment	1.15	0.58	0.96	0.80
Household appliances	1.14	..	..	..
Radio, television, and communication equipment	1.41	..	..	..
Electronic components and accessories	1.34	0.66	0.80	0.88
Other electric and electronic equipment	1.01	..	..	..
Transportation equipment	1.02	0.90	1.09	0.97
Motor vehicles and equipment	0.98	0.99	1.25	0.96
Other transportation equipment	0.99	1.45	0.52	1.14
Other manufacturing	1.02	0.88	1.07	0.94
Tobacco products	1.14	..	..	..
Textiles and apparel	1.02	0.80	0.99	0.92
Lumber, wood, furniture	1.04	0.80	0.63	1.04
Paper and allied products	0.95	1.42	0.61	1.21
Printing and publishing	1.02	..	..	..
Rubber products	1.03	0.83	1.14	0.88
Miscellaneous plastic products	0.79	1.29	2.23	0.87
Glass products	1.04	..	..	..
Stone, clay, cement and concrete products	1.08	0.73	1.13	0.90
Instruments and related products	1.04	0.91	0.85	1.00
Wholesale trade	1.25	0.83	0.91	0.98
Durable goods	1.58	0.81	0.90	0.98
Non-durable goods	1.00	1.02	0.94	1.02
Retail trade	1.02	0.96	0.39	1.08
Finance, insurance and real estate	0.99	1.10	1.67	0.94
Mining	1.07	0.71	1.25	0.75

Table 5-3 (concl.)

	U.S.-parent share of system, 1984/77	DC affiliate share of system, 1984/77	LDC affiliate share of system, 1984/77	DC affiliate share of all affiliates, 1984/77
Transportation, communications, and utilities	1.00	0.62	1.76	0.65
Services	1.11	0.75	0.64	1.04
Mean	1.053	0.933	1.089	0.953
Standard deviation	0.163	0.232	0.391	0.105
Number of observations	50	42	42	42

*These are ratios of 1984 to 1977 employment shares. The percentage change in employment share is obtained by subtracting one from the values in the table.

SOURCE U.S. Department of Commerce (1981), Tables III.G.3 and III.S.1; and (1987*a*), Tables 46 and 54.

parent, while the LDC or perhaps low-wage functions continued to be shifted to less-developed countries. If correct, this thesis casts the continuing role of majority affiliates in developed countries into question.

While this is an interesting and provocative conclusion, the analysis here only points in this direction. It is subject to a number of important qualifications. First, it relies on employment as a measure of value-adding activity. Aggregate employment grew more quickly in the United States than in Europe over the 1977-84 period, while productivity grew more slowly (OECD, 1987). Thus the increase in the employment share of U.S. parents overstates the increase in the parents' share of value added.

Second, employment share changes may reflect changes in the relative importance of centralized and decentralized segments of an industry rather than an explicit policy of centralization. The transportation equipment industry provides a good illustration of this point. As Table 5-3 indicates, U.S.-parent employment share did not increase in either segment of this industry. What did happen is that the relatively decentralized automotive industry declined in (employment) size relative to the other transportation equipment industry (largely aircraft and parts) which is relatively centralized.

Similar differences may exist within more narrowly defined industries. For example, new U.S. parents, that is, those acquiring foreign affiliates since 1977, may have tended to make their initial acquisitions in less-developed countries thus departing from the pattern established by their predecessors. The same may have been true of the newer and perhaps faster growing parents in existence in 1977.

Third, employment share changes may reflect differences in the respective growth rates of national income in the economies involved. Over the period being examined, the growth rate of total and manufacturing GDP in the United States exceeded the growth rates of the larger European economies. The growth of employment in U.S. parents relative to DC affiliates may have more to do with local market conditions than organizational change.

Aggregate growth rates can differ over the long term (reflecting differences in labour force growth) and over the business cycle. Cyclical effects on employment shares can be minimized by comparing national economies at similar points in their respective business cycles. An alternative is to determine the sensitivity of changes in national employment shares to changes in the measurement period.

Using data for 1982 and preliminary 1985 data, we find that the share of U.S. parents in system employment in the manufacturing industries increased by 1.2 per cent over the 1977-82 period, 2.9 per cent over the 1977-84 period, and 2.8 per cent over the 1977-85 period.

The implied annual rate of change in the employment share of U.S. parents was 0.24 per cent between 1977 and 1982, and 0.35 per cent between 1977 and 1985. This is consistent with a faster rate of cyclical recovery in the United States than in Canada and Europe over the 1982-85 period.

Fourth, an affiliate leaves the majority category and employment of majority affiliates as a group is reduced if the parent's equity interest falls below 50 per cent and *vice versa*. Observed changes in employment shares may thus be a consequence of changes in ownership status. Specifically,

the increase in the employment share of U.S. parents may be a consequence of an increased incidence of minority ownership. The effect of any shifts between minority and majority ownership on employment shares can be eliminated by using both minority (parent equity interest between 10 and 49 per cent) and majority-affiliate employment in share calculations.

If system employment is defined to include U.S. parents and all affiliates, the parent share of manufacturing employment increased by 2.2 per cent between 1977 and 1984 (rounded to 2 per cent in Table 5-4). This compares with an increase in parent share of 2.9 per cent (rounded to 3 per cent in Table 5-5) when only majority affiliates are included. The evidence in favour of centralization thus becomes weaker when employment in minority affiliates is taken into account. As will become evident, this result is due to an increase in the proportion of European-affiliate employment accounted for by minority affiliates.

It is generally agreed (Safarian, 1983) that restrictions on majority foreign ownership are more common in developing countries than in developed countries. In this case, the effect of employment growth in LDC affiliates on employment shares is fully captured only by including minority affiliates in the calculation.

The proportion of employment accounted for majority affiliates is greater in developed than developing countries (75 vs. 73 per cent in manufacturing in 1984).

The proportion of LDC manufacturing affiliate employment accounted for by majority affiliates rose by 3 per cent, however, between 1977 and 1984. As a consequence, the share of all (majority plus minority) LDC affiliates in system manufacturing employment increased by less (2 per cent) than the share of majority LDC affiliates (6 per cent, see Tables 5-3 and 5-4).

To summarize, minority affiliates grew relative to majority affiliates in developed countries and declined in developing countries with minority affiliates becoming more important overall. As a result, the respective increases in parent and LDC affiliate employment shares become smaller when minority affiliates are taken into account.

Turning now to the Canadian experience, Table 5-5 indicates, first, that employment in Canadian (majority) affiliates declined relative to U.S.-parent employment in aggregate and in most industries. Significant exceptions in which the employment share of Canadian affiliates increased markedly include miscellaneous plastics, crude petroleum and gas, retail trade and construction and related machinery.

Table 5-4

Percentage Change in Employment Shares: Parents, Majority and Minority Affiliates, 1977-84

	U.S.-parent share of system, 1984/77	LDC affiliate share of system, 1984/77	Canadian share of North American employment, 1984/77	DC affiliate employment, 1984/77
All industries	1.04	0.93	0.81	0.95
Petroleum	1.07	1.04	0.73	1.08
Manufacturing	1.02	1.02	0.82	0.91
Food and kindred products	1.02	1.06	0.64	0.75
Chemical and allied products	1.07	0.86	0.95	1.16
Primary and fabricated metals	1.04	1.03	0.83	0.99
Machinery, electric and electronic equipment	1.16	0.89	0.52	0.90
Transportation equipment	0.95	0.99	1.25	1.06
Other manufacturing	1.02	0.83	0.57	0.76
Wholesale trade	1.65	0.87	0.68	1.45
Retail trade	1.02	0.46	1.01	1.05
Finance, insurance and real estate	0.99	1.03	0.73	0.67
Mining	1.04	1.05	0.82	0.82
Services	1.19	0.57	0.43	0.72

SOURCE U.S. Department of Commerce (1981), Tables II.G.3 and III.S.1; and (1987*a*), Tables 12 and 54.

Table 5-5

Percentage Change in the Employment Share of Canadian Affiliates, 1977-84

	Canadian share of:		
	North American employment	System employment	DC affiliate employment
All industries	0.87	0.89	1.03
Petroleum	0.78	0.80	1.05
Oil and gas extraction	0.64	0.62	0.72
Crude petroleum and gas	1.56	0.75	0.57
Oil and gas field services	0.56	0.77	1.22
Petroleum and coal products	0.96	0.94	1.03
Manufacturing	0.85	0.86	1.01
Food and kindred products	0.65	0.66	0.74
Grain mill and bakery products	0.56	0.55	0.58
Beverages	0.74	0.74	0.80
Other food	0.66	0.69	0.79
Chemical and allied products	1.01	1.05	1.12
Industrial chemicals and synthetics	1.16	1.18	1.12
Drugs	1.15	1.21	1.23
Soap, cleaners, and toilet goods	0.98	1.05	1.31
Primary and fabricated metals	1.16	1.10	0.83
Primary metals	1.52	1.47	0.88
Fabricated metal products	0.80	0.79	0.84
Machinery, except electrical	0.86	0.90	1.13
Farm and garden machinery	..	..	..
Construction and related machinery	1.45	1.48	1.70
Office and computing machines	0.59	0.65	..
Other machinery, except electrical	1.01	1.00	1.09
Electric and electronic equipment	0.52	0.59	1.01
Household appliances	0.88	0.98	..
Radio, television, and communication equipment	..	..	..
Electronic components and accessories	..	..	..
Other electric and electronic equipment	0.78	0.78	..
Transportation equipment	1.25	1.29	1.44
Motor vehicles and equipment	..	..	..
Other transportation equipment	..	..	..
Other manufacturing	0.69	0.69	0.78
Tobacco products	..	..	..
Textiles and apparel	0.68	0.69	0.86
Lumber, wood, furniture	0.67	0.67	0.84
Paper and allied products	0.73	0.67	0.47
Printing and publishing	1.12	1.14	..
Rubber products	..	..	..
Miscellaneous plastic products	1.88	1.53	1.19
Glass products	..	..	..
Stone, clay, cement and concrete products	0.43	0.44	0.61
Instruments and related products	0.53	0.54	0.59
Wholesale trade	0.69	0.82	0.99
Durable goods	0.60	0.82	1.02
Non-durable goods	0.94	0.94	0.92
Retail trade	1.45	1.51	1.57
Finance, insurance and real estate	0.73	0.72	0.65
Mining	0.78	0.76	1.07

Table 5-5 (concl.)

	Canadian share of:		
	North American employment	System employment	DC affiliate employment
Transportation, communications, and utilities	0.51	0.50	0.81
Services	0.47	0.50	0.67
Mean	0.877	0.875	0.954
Standard deviation	0.333	0.288	0.277
Number of observations	42	42	38

SOURCE U.S. Department of Commerce (1981), Tables III.G.4 and III.S.1; and (1987*a*), Tables 47 and 54.

Because of the size of U.S. parents relative to multinational enterprises as a whole, the change in the proportion of system employment accounted for by Canadian affiliates is similar in most cases to the change in the proportion of Canada-U.S. employment accounted for by Canadian affiliates. There are exceptions. For example, although Canadian affiliates accounted for an increased share of Canada-U.S. employment in the crude petroleum and gas industry, they accounted for a much smaller share of system employment.

The experience of Canadian affiliates vis-à-vis the U.S. parent and the system as a whole reflects that of DC affiliates as a group. As Table 5-3, column 2, indicated, DC affiliates as a group lost employment share both to the U.S. parent and to the system as a whole over the 1977-84 period. The share of Canadian affiliates in DC affiliate employment increased marginally both in manufacturing (1 per cent) and over all (3 per cent).

While DC affiliates as a group experienced a loss of employment share to the U.S. parent and to the system as a whole, there were also large shifts in employment share among DC affiliates. From Table 5-5, column 3, the industries in which Canada had the largest gains in employment relative to DC affiliates as a group include: construction and related machinery, retail trade, transportation equipment and the chemical industries. Industries or sectors in which employment in Canadian affiliates has fallen markedly relative to affiliates in other developed countries include paper and allied products, crude petroleum and gas, instruments and related products, stone, clay, glass, and finance.

Inferences regarding the employment share of Canadian affiliates may be sensitive to the period of observation. The observed decline in employment in Canadian affiliates relative to U.S. parents may, for example, be a consequence of a faster U.S. recovery from the 1981-82 recession. The sensitivity of the Canadian affiliate share of Canadian affiliate plus U.S.-parent employment to modest changes in the sample period is illustrated as follows:

Percentage Change in Canadian Affiliate Share of North American Employment, 1977-85

	1977-82	1977-84	1977-85
All industries	–17	–13	–11
Manufacturing	–13	–15	–14
Primary and fabricated metals	–12	+16	+32
Petroleum	–28	–22	–34
Retailing	+8	+45	+47

These comparisons reveal that, for all industries taken together, the Canadian employment share does increase steadily as the sample period is lengthened. This implies that the observed decrease in the Canadian employment share is partly cyclical. This reasoning receives no support from employment shares in manufacturing which did not vary appreciably between 1982 and 1985. Within the manufacturing sector, however, employment shares sometimes do show the influence of different cyclical behaviour of Canadian and U.S. economies. The employment share of Canadian affiliates in the primary and fabricated metals industry, for example, follows a pattern which is consistent with a slower cyclical recovery in Canada than in the United States. The same may be true of retailing. In most cases, however, the cyclical influence is intermingled with industry-specific effects. Disaggregation clearly increases the volatility of employment shares.

The Canadian share of DC affiliate employment both in all industries and in manufacturing was also higher in 1985 than in 1984. The differences are approximately 2 percentage points and 1 percentage point for all industries and manufacturing, respectively. The inference that employment in Canadian majority affiliates has increased relative

to other DC affiliates appears to increase in strength as the sample period is lengthened.

Inferences regarding the employment shares of Canadian affiliates may also be sensitive to changes in ownership status, that is, to the migration of affiliates between majority and minority ownership. Over the 1977-84 period, the proportion of Canadian affiliate employment accounted for by majority affiliates increased from 86 to 93 per cent in all industries and from 91 to 94 per cent in manufacturing. There are very few exceptions among individual industries to this aggregate result.

As a consequence, the share of all Canadian affiliates (majority and minority) in North American employment declines by more than the share of majority affiliates alone. This is illustrated in Tables 5-4 and 5-5.

Among DC affiliates as a group, the proportion of employment accounted for by majority affiliates in manufacturing decreased from 81 to 75 per cent over the 1977-84 period. Majority affiliates thus became relatively more important in Canada (in employment terms) and relatively less important in other developed countries. The result of this is that while the Canadian share of DC majority-affiliate employment in manufacturing increased by 1 per cent (Table 5-5), the Canadian share of majority- plus minority-affiliate employment fell by 9 per cent (Table 5-4). The results are similar for the Canadian share of system employment.

The relative growth of minority affiliates in developed countries other than Canada could be due to any or all of faster employment growth among existing minority affiliates, conversion of majority to minority affiliates and the acquisition of new minority affiliates. On the basis of published data, it is impossible to determine which of these factors is at work. The same is true of the relative decline of minority affiliates in Canada and developing countries.

This study focuses largely on the experience of majority affiliates. The latter constitute a homogeneous group, the actions of which are unquestionably subject to parental direction. This is not necessarily true of minority affiliates in which parents may have as little as a 10 per cent equity interest. There is, in addition, a great deal more information on the activities of majority affiliates. A more thorough investigation of the incidence of minority ownership and its determinants remains a topic for future research.

A comparison of the respective characteristics of the industries in which Canadian majority affiliates gained or lost employment share is reported in Table 5-6. The industries in which employment in Canadian affiliates grew relative to either all affiliates or all DC affiliates tend to be more R&D-intensive (as measured by parent R&D intensity) but neither more nor less trade-intensive than the industries in which the employment share of Canadian affiliates declined.

For some of the industries included in Tables 5-3 and 5-5, the concept of trade intensity is not meaningful. For example, non-durable goods wholesalers are highly export-intensive but this is more a characteristic of the goods they sell than of the wholesalers themselves. For this reason the trade intensity and the rate of export growth of the manufacturing industries in which Canadian affiliates gained and lost employment share are also compared in Table 5-6. The result is that Canadian affiliates tended to gain shares in the industries characterized by higher trade intensity (export/sales ratio) and faster trade growth.

To summarize, the analysis of changes in employment shares over the 1977-84 period reveals that:

- The share of U.S. parents in system employment has increased. Some of this increase appears to be cyclical in nature. The balance could be due to differential rates of productivity growth and changes in the industrial composition of employment.

- The share of Canadian majority affiliates in North American and system employment declined. The share of Canadian affiliates in DC affiliate employment increased. Canadian affiliates show up slightly better when cyclical effects on employment are taken into account.

- The industries in which Canadian affiliate employment shares have increased (relative to other affiliates) are characterized by higher R&D and trade intensity and greater trade growth.

- When employment in minority affiliates is taken into account, parent and Canadian and LDC affiliate employment shares tend to do worse and other DC employment shares better than when only majority affiliates are taken into account.

Determinants of Interindustry Differences in the Change in the Employment Share of Canadian Affiliates

In this section, we report the results of a statistical investigation of the factors which determine the change in

Table 5-6

Differences in the Respective Characteristics of Industries in which the Employment Share of Canadian Affiliates Rose and Fell, 1977-84

	Canadian share of:	
	DC majority-affiliate employment rising vs. falling	All majority-affiliate employment rising vs. falling
Difference in parent R&D intensity, 1977	0.016	0.015
	(2.63)	(2.18)
Difference in system export intensity, 1977	0.052	0.000
	(1.01)	(0.04)
Difference in system rate of growth of exports, 1984/77	–0.508	0.336
	(0.52)	(0.33)
Difference in system export intensity, 1977 (manufacturing only)	0.064	0.052
	(2.26)	(1.68)
Difference in system rate of growth of exports, 1984/77 (manufacturing only)	0.647	0.533
	(2.29)	(1.73)

NOTE Figures in parentheses are absolute *t*-ratios; 28 observations; 17 manufacturing observations.

the employment share of Canadian affiliates relative, first, to U.S. parents and, second, to all other affiliates.

As was discussed in Chapter 2, the global distribution of production depends on the technology of the industry in question, on local production costs and on the magnitude of impediments to trade. In this analysis we assume, out of necessity, that over the period in question (1977-84), the underlying technology did not change. In this case, the change in the proportion of employment accounted for by Canadian affiliates should be a function of the relative cost advantage of Canadian production and/or changes in it, and of changes in Canadian and foreign trade barriers.

Beginning with the change in the Canadian affiliate share of Canadian affiliate and U.S.-parent employment, we define the dependent variable as:

$$CAC8477 = \frac{AN84(AN84 + PEM84)}{AN77(AN77 + PEM77)}$$

where

$AN84$ = employment of Canadian affiliates in the ith industry in 1984; and

$PEM84$ = employment of U.S. parents in the ith industry in 1984.

As a measure of the difference between unit labour cost in each country in 1977, we define:

$$RPD77 = RCW77/RSW77$$

where

$RCW77$ = Canadian affiliate compensation per worker, 1977/U.S.-parent compensation per worker, 1977; and

$RSW77$ = Canadian affiliate sales per worker, 1977/U.S.-parent sales per worker, 1977.

The variable $RSW77$ is intended to measure the productivity difference between Canadian affiliates and U.S. parents. A measure of productivity differences which is not sensitive to the degree of vertical integration is relative value added per worker. Unfortunately, value-added data were not available and relative sales per worker must serve as a proxy for relative productivity.

Data on Canadian tariff barriers were made available for the years 1971, 1977, 1982 and 1985. Two basic measures of the change in Canadian tariff barriers are calculated. For the 1977-85 period, they are:

$$DCF8577 = \frac{\text{Proportion of imports dutiable, 1985}}{\text{Proportion of imports dutiable, 1977}} \quad \text{and}$$

$$DCT8577 = \frac{\text{Duties collected/Value of dutiable imports, 1985}}{\text{Duties collected/Value of dutiable imports, 1977}}.$$

Data on changes in U.S. or other foreign tariff barriers were not available. Indirect measures in the form of changes in system and affiliate export and internal trade industry are employed. These are defined as:

$$SEI8477 = \frac{\text{System export/sales ratio, 1984}}{\text{System export/sales ratio, 1977}}$$

$$CSIR8477 = \frac{\text{System internal sales/total sales ratio, 1984}}{\text{System internal sales/total sales ratio, 1977}}$$

$$CEI8477 = \frac{\text{Affiliates' export sales/total sales ratio, 1984}}{\text{Affiliates' export sales/total sales ratio, 1977}}$$

$$CIR8477 = \frac{\text{Affiliates' internal sales/total sales ratio, 1984}}{\text{Affiliates' internal sales/total sales ratio, 1977}}.$$

As presently defined, the dependent variable includes the employment of all U.S.-parent firms whether they have Canadian affiliates or not. It can change for reasons which have little to do with the distribution of production between Canada and the United Sates. Thus a U.S. firm may become a parent by acquiring a Mexican affiliate and the denominator rises even though there has been no change in either U.S. or Canadian employment. Similarly, a U.S. parent may be acquired by a U.S. firm in another industry. The denominator falls in the first industry and rises in the second even though there is again no change in employment in either country. In order to control for this effect, the change in the proportion of U.S. parents with a Canadian affiliate is included as an explanatory variable (*PCN*8277).

Estimates of the North American employment share change model are reported in Table 5-7. The most prominent and robust result is that the employment share of Canadian affiliates tends to increase more (decrease less) the greater is the increase in system export intensity. Although its coefficient approaches statistical significance in only one of the cases reported, there is at least a tendency for the employment share of Canadian affiliates to increase with the proportion of imports free of duty.

The increase in the Canadian affiliate employment share tended to be smaller the greater was their initial (1977) labour-cost disadvantage and the greater was the increase in the proportion of U.S. parents with Canadian affiliates. This last result is contrary to expectations and may be a consequence of the shorter time period over which this variable was measured.[2]

Changes in the tariff rate are never statistically significant and these results are not reported. Results for the change in the proportion of imports free of duty are similar but slightly weaker if the change is measured over the 1977-82 period.

The general conclusion to be drawn from these results is that, in employment terms, Canadian affiliates have done better relative to U.S. industries in the industries characterized by greater increases in trade intensity and, to a degree, by greater reductions in Canadian trade barriers.

We also investigate the determinants of interindustry differences in the change in the proportion of affiliate employment accounted for by Canadian affiliates over the 1977-84 period. In this case, the dependent variable is:

$$CAA8477 = \frac{AN84/AAN84}{AN77/AAN77}$$

where

*AN*84 = employment of Canadian majority affiliates in the *i*th industry in 1984; and

*AAN*84 = employment of all majority affiliates in the *i*th industry in 1984.

The difference between unit labour costs in Canadian affiliates and those prevailing in other affiliates is measured as:

$$CWGSPW = (CPWC77/CPWL77) - (SPWC77/SPWL77)$$

where

CPWC = compensation per worker in Canadian affiliates in the *i*th industry;

Table 5-7

Determinants of the Change in the Proportion of North American Employment Accounted for by Canadian Affiliates, 1977-84

Explanatory variables	Equation 1	Equation 2	Equation 3
*RPD*77	–0.416	–0.352	–0.415
	(1.86)	(1.60)	(1.35)
*DCF*8577	0.243	0.195	0.475
	(1.19)	(0.97)	(1.73)
*PCN*8277	–0.906	–0.972	–1.34
	(2.09)	(2.31)	(2.11)
*SEI*8477	0.977	0.772	–
	(3.58)	(2.56)	–
*CSIR*8477	–	0.267	–
	–	(1.40)	–
*CEI*8477	–	–	0.928
	–	–	(1.54)
*CIR*8477	–	–	0.070
	–	–	(0.27)
Constant	0.436	0.564	0.487
	(1.24)	(1.34)	(0.68)
R^2	0.55	0.58	0.20
n	18	18	18

NOTE Figures in parentheses are absolute *t*-ratios.

CPWL = compensation per worker in LDC affiliates;

SPWC = sales per worker in Canadian affiliates; and

SPWL = sales per worker in LDC affiliates.

The variable *CWGSPW* is an increasing function of the excess of Canadian compensation per worker relative to LDC compensation per worker over Canadian sales per worker relative to LDC sales per worker. The greater is *CWGSPW* in 1977, the larger is the expected decline in the proportion of affiliate employment accounted for by Canadian affiliates. Notice the assumption here is that Canadian employment share losses to or gains from other developed countries also depend on the relative levels of Canadian and LDC "unit labour costs." A more refined analysis would attempt to explain shifts in employment between Canadian and DC and LDC affiliates, respectively. In the first case the shift would be a function of the relative levels of Canadian and DC affiliate unit costs. In the second it would be a function of the relative levels of Canadian and LDC affiliate unit costs.

Changes in Canadian trade barriers are as described in connection with the North American employment share change model as are the measures of changes in export and internal sales intensity.

The estimates of the change in affiliate employment share model are reported in Table 5-8. As the R^2 values reported at the bottom of the table attest, interindustry differences in the change in the proportion of affiliate employment accounted for by Canadian affiliates are virtually random. There is weak evidence that the increase in the Canadian share was smaller the greater was the initial (1977) labour-cost disadvantage. An increase in the proportion of Canadian imports free of duty has no effect on employment share. The same is true of decreases in the tariff rate (not reported). The same is also true of changes in Canadian trade barriers measured over the 1977-82 period.

The only indication of a positive trade-employment share linkage comes in the next equation. To this equation the variable *IEA77* has been added. It reflects initial affiliate export and internal sales intensity and is defined as:

$$IEA77 = ISR77 + AEI77$$

where

ISR77 = all affiliate internal sales/total sales ratio, 1977; and

AEI77 = all affiliate export sales/total sales ratio, 1977.

Table 5-8

Determinants of the Change in the Proportion of Majority-Affiliate Employment Accounted for by Canadian Affiliates, 1977-84

Explanatory variables	Equation 1	Equation 2	Equation 3
CWGSPW	–0.167	–0.190	–0.093
	(1.66)	(1.81)	(1.08)
DCF8577	0.084	0.184	0.004
	(0.40)	(0.87)	(0.02)
SEI8477	0.274	–	0.377
	(0.80)	–	(1.55)
CSIR8477	0.03	–	–
	(0.16)	–	–
CEI8477	–	0.162	–
	–	(0.35)	–
CIR8477	–	–0.128	–
	–	(0.64)	–
IEA77	–	–	3.013
	–	–	(1.79)
Constant	0.746	0.870	0.446
	(2.25)	(1.52)	(1.55)
R^2	0.07	0.07	0.29
n	18	18	18

NOTE Figures in parentheses are absolute *t*-ratios.

This equation provides weak (i.e., 10 per cent significance level) evidence that the employment share of Canadian affiliates tended to increase more in the industries characterized by both high affiliate export and internal sales intensity and a high rate of growth of system export intensity.

Further analysis reveals that trade intensity and trade-intensity growth variables are able to separate industries characterized by increasing and declining Canadian employment shares, respectively (see also Table 5-6). Increased trade intensity is associated with an increasing Canadian employment share. As is obvious from Table 5-8, these variables are not effective in explaining the *magnitude* of employment share increases or decreases.

There are good reasons to believe that variation in the Canadian affiliate share of affiliate employment should be

less systematic than variation in the Canadian share of North American employment. Given the role of U.S. parents in both system exports and in trade with Canada, it is not surprising to observe a strong link between growth of system export intensity and the North American employment share of Canadian affiliates. It is encouraging to find that this relationship is positive.

Finally, although the relationship between reductions in Canadian trade barriers and Canadian employment share varies from none to weakly positive, it is never negative. These models provide not a trace of support for arguments that Canadian tariff reductions export jobs.

Evidence on Relative Magnitudes of International Employment Share Shifts

In the second section of this chapter, the geographic and industrial incidence of the redistribution of employment by U.S. multinationals was examined. In this section, we attempt to compare the international redistribution of employment by U.S. multinationals in various industries with the overall redistribution of employment.

The purpose of this comparison is to determine whether the international redistribution of employment within the U.S. multinationals is in the same direction and, if so, is more or less extreme than the overall redistribution occurring in a given industry.

The initial expectation is that the pattern of redistribution of employment within multinationals in a particular industry will be reflective of the experience of that industry. If the advantage of producing in a particular geographic area increases, a variety of entrants, multinational and otherwise, are likely to be attracted.

While the patterns of redistribution should be broadly similar, they will not be the same. There are several reasons for this. First, some nations prohibit majority foreign ownership of local firms so that employment growth (or decline) takes place in minority affiliates or locally owned firms. Second, the movement of production offshore or to a new offshore source of supply may also involve the temporary or longer-term use of an unaffiliated supplier. The process of vertical disintegration occurs simultaneously with the geographic relocation of production.

The use of subcontractors varies across industries being especially prevalent in the apparel industry. It may also vary among countries within industries depending on the existence of potential local contractors. Grunwald and Flamm conclude that:

> In all countries, subcontracting by independent firms appears to be the principal mode of having assembly done abroad in the apparel industry. In electronics, however, such operations are usually carried out by subsidiaries or multinational enterprises (p. 218).

Within the apparel industry, Grunwald and Flamm report that the proportion of U.S. imports coming from unrelated foreign suppliers averaged 88 per cent in 1978 and ranged from 99.7 per cent in the case of Singapore, 29.2 per cent in the case of the Dominican Republic (p. 211).

Of course, if all changes in source of supply by multinationals involve subcontractors, then changes in the distribution of multinational employment will be uncorrelated with changes in the overall distribution of employment in the industry in question.

Focusing on internal production (i.e., production of majority affiliates), the rate of change of employment in local affiliates of multinationals may be faster or slower than is the case for domestic firms. The folk wisdom is that multinationals will expand and contract faster than will local firms. The evidence cited in Chapter 2 appears to indicate the opposite. Flamm (1984), Williamson (1986) and Grunwald and Flamm (1985) have found that holding industry characteristics constant, the short-term response of multinationals to changes in the relative cost of local production is modest both in absolute terms and relative to the response of domestic firms. Over the longer term, almost by definition, multinationals should display greater locational responsiveness.

A simple test of these competing hypotheses is to estimate the model:

$$EM_{ijt} = a + b\, EN_{ijt}$$

where

EM_{ijt} = percentage change in employment of majority U.S. affiliates in country i and industry j over time period t; and

EN_{ijt} = percentage change in total employment in country i and industry j over period t.

If affiliate employment is more volatile than local unemployment, then $b > 1$. Obviously, the model could also be used to test for asymmetries in the relationship between affiliate and total domestic employment growth.

Some evidence on the relative growth rates of U.S. majority affiliate and total domestic employment in the electrical products industry is presented in Table 5-9. Over the 1977-83 period, there were clearly vast discrepancies between total domestic and U.S. major affiliate employment growth rates. Indonesia, for example, reports employment growth of 10.3 per cent while U.S. affiliate employment declined by 9 per cent over the same period.

Estimating the model using the data presented in Table 5-9, we obtain a correlation coefficient of 0.49 and a b value of 0.83 with a standard effort of 0.35. The null hypothesis that $b = 0$ can be rejected at the 95 per cent confidence level while the hypothesis that $b = 1$ cannot.

To test the asymmetry hypothesis, the model is rewritten as:

$$EM_{ijt} = a + b_1 ENP_{ijt} + b_2 ENN_{ijt}$$

Table 5-9

Average Annual Rate of Growth of Employment in the Electrical Products Industry, 1976-83

	Growth rate in:	
	Employment[1]	U.S. affiliate employment[2]
Korea	3.7	7.4
Indonesia	10.3	–9.0
Hong Kong	6.6	–3.0
Malaysia	8.6	12.4
Philippines	12.7[3]	18.5[4]
Singapore	6.9	–0.6
Columbia	–1.6	0.7
Mexico	–1.2	8.8
Panama	6.2	0.0
Belgium	–3.3	–0.4
France	–0.4	–5.1
Germany	–1.0	–2.1
Netherlands	–2.2	–11.2
United Kingdom	–3.4	–13.2
Italy	–4.6	–4.2
Spain	–1.2	–5.8
Ireland	3.8	13.7
Canada	2.4[5]	3.7
United States	1.6	5.9[6]
Australia	–2.1	–5.7

1 United Nations, *Industrial Statistics Yearbook*, vol. 1 (various editions).
2 U.S. Department of Commerce, 1981 and 1986.
3 U.S. Department of Commerce, 1976-81.
4 U.S. Department of Commerce, 1977-82.
5 Statistics Canada, document no. 31-203.
6 U.S.-parent employment.

where

ENP_{ijt} = EN_{ijt} if $EN_{ijt} > 0$, zero otherwise; and

ENN_{ijt} = EN_{ijt} if $EN_{ijt} < 0$, zero otherwise.

We find that $b_1 = 0.56$ and $b_2 = 1.82$ but that neither differ statistically from zero. Despite the difference in the magnitudes of the two coefficients (which implies that, on average, U.S. multinationals expand more slowly and contract more quickly than local firms or other multinationals in this industry), the null hypothesis of a symmetric relationship cannot be rejected.

Some evidence on the respective magnitudes of shifts in U.S. multinational and total employment between developed and less-developed countries is presented in Table 5-10. Columns (1) and (2) show the five-year (1977-82) rate of growth in employment in less-developed and developed countries, respectively, for 11 industries. Column (3) can be interpreted as the percentage change in the ratio of LDC to DC employment over the same period. Thus the ratio of LDC to DC employment in manufacturing increased by 13.5 per cent over the 1977-82 period.

Columns (4) and (5) show the percentage change in U.S. multinational employment in LDCs and DCs, respectively. LDC employment includes only majority affiliates. DC employment includes U.S. parents and majority affiliates. Column (6) shows the percentage change in the ratio of LDC to DC employment by U.S. multinationals over the 1977-82 period. Thus the ratio of LDC to DC employment changed by 10.9 per cent over this period.

Column (7) compares, with the U.S. multinational change, the overall ratio of LDC to DC employment. In the manufacturing sector, the overall ratio increased 24 per cent more than the U.S. multinational ratio. This implies that the employment shift to LDCs within U.S. multinationals was marginally smaller than in the manufacturing sector as a whole. As the balance of column (7) indicates, relative employment shifts vary widely across industries. For example, in the textiles, apparel and leather industry, the overall shift in employment from developed to less-developed countries was about 3.5 times as great as the employment shift which occurred within U.S. multinationals. Possible reasons have been suggested above. If multinationals make use of independent contractors, measured employment shifts will be smaller than actual employment shifts and may be zero. Other possibilities are that multinationals inhabit segments of the industry where there is less to be gained by shifting production or that they are simply slow to adjust.

Table 5-10

Differences in Employment Growth Rates in Developed and Less-Developed Countries: Industry Totals vs. U.S. Multinationals, 1977-82

	(1) LDC employment growth rate	(2) DC employment growth rate	(3) (1) – (2)	(4) LDC affiliate employment growth rate	(5) DC affiliate plus U.S-parent growth rate	(6) (4) – (5)	(7) (3)/(6)
Crude petroleum and natural gas	42.9	71.8	–28.9	–13.5	101.3	–114.8	0.25
Manufacturing	6.6	–6.9	13.5	2.3	–8.6	10.9	1.24
Food, beverage and tobacco	–1.1	–4.0	2.9	–4.1	–0.7	–3.4	0.00
Textiles, apparel and leather	41.7	–12.4	54.1	–14.1	–29.5	15.4	3.51
Wood products, furniture	23.5	–15.4	38.9	15.8	–26.6	42.4	0.92
Paper and paper products	11.1	–10.5	21.6	24.9	–20.3	45.2	0.48
Chemicals, petroleum and plastics	14.6	–4.0	18.6	6.4	12.6	–6.2	0.00
Rubber and plastic products	13.6	–1.0	14.6	–5.2	–30.8	25.6	0.57
Non-metallic products	20.7	–10.8	31.5	3.4	–13.4	16.8	1.88
Primary metals	4.2	–16.2	20.4	–1.9	–46.0	44.1	0.46
Fabricated metals and machinery	10.2	–3.1	13.3	9.2	–3.4	12.6	0.73

SOURCE U.S. Department of Commerce (1981, 1985); United Nations, *Industrial Statistics Yearbook*, 1983, vol. 1.

The opposite considerations arise in the paper and primary metals industries where the shift in multinational employment was twice as large for each industry as a whole.

International Shifts in the Location of Production: Evidence from Export Data

In this section, export share data derived from the U.S. Department of Commerce annual and benchmark surveys are used to measure changes in the international distribution of production by U.S. multinationals. The analysis begins with a commentary on the changes in the proportion of system (U.S.-parent plus all majority-affiliate) exports accounted for by Canadian majority affiliates over the 1966-85 period.

The shares of Canadian affiliates in system exports during the 1966-85 period are reported in Table 5-11. As the table shows, the share of Canadian affiliates in system manufactured exports increased from 10.4 per cent in 1966 to 12.2 per cent in 1984. Underlying this has been a 90 per cent increase in the proportion of transportation equipment exports accounted for by Canadian affiliates and a 47 per cent reduction in the proportion of other manufactured exports (largely forest products) accounted for by Canadian affiliates. Although the absolute amount involved is not large, there has been a very large percentage decline in the share of system exports of food and kindred products accounted for by Canadian affiliates (86 per cent between 1966 and 1984).

Focusing on the 1977-84 period, we find a decline in the proportion of system exports accounted for Canadian affiliates in the food and kindred products, primary and fabricated metals and other manufacturing industries, respectively, and increases in chemicals, non-electrical machinery and transportation equipment. The proportion of system exports of electrical equipment accounted for by Canadian affiliates appears to have remained more or less unchanged.

The interpretation of changes in export shares is not without its ambiguities. It is possible, for example, for a country to account for a higher share of system exports even though it accounts for a lower share of system value added. Offshore production by U.S. firms in the electronics industry is a case in point. As the discussion in Chapters 1 and 2 indicates, this has become an increasingly important phenomenon in recent years.

An increase in offshore production by U.S. parents implies an increase in their intermediate goods exports to

Table 5-11

Canadian Majority-Affiliate Share of Parent plus Majority-Affiliate (System) Exports, 1966-85

	1966	1977	1982	1983	1984	1985[P]
			(Per cent)			
Food and kindred products	9.8	5.8	1.7	1.7	1.4	2.0
Chemical and allied products	6.6	2.4	D	3.4	3.5	3.6
Primary and fabricated metals	3.1	12.9	5.1	7.5	9.2	10.2
Machinery	3.9	2.9	D	3.2	3.4	3.3
Non-electrical machinery	–	3.0	D	3.7	3.9	3.5
Electrical machinery	–	2.9	2.5	2.6	2.6	2.9
Transportation equipment	15.2	22.3	23.5	26.4	28.9	26.1
Other manufacturing	18.4	13.7	9.1	9.3	9.8	10.0
All manufacturing	10.4	11.3	9.4	11.1	12.2	11.9

P Preliminary figures.

D Suppressed to avoid disclosure of data of individual companies.

SOURCE U.S. Department of Commerce (1975), Table K-1; (1981), Tables III.H.4 and III.H.5; (1985), Tables III.E.4 and III.E.5; and (1986*a*, 1987*a*, 1987*b*), Tables 37, 38 and 57.

affiliates in developing countries. The share of the parent in system exports can increase as a consequence even though the parent's share of system value added clearly does not. If Canadian affiliates do not engage in offshore production to the same degree as the parent, the share of Canadian affiliates in system exports may decline even though their share in system value added has remained constant.[3]

There has been a large increase in intermediate goods trade between U.S. parents and LDC affiliates in some industries, notably electronics. Exports of electronic equipment (called electrical machinery in the tables) from U.S. parents to majority LDC affiliates increased by 258 per cent between 1977 and 1984. Imports by U.S. parents from LDC affiliates increased by 203 per cent.[4]

The limited data available indicate that Canadian affiliates have not followed this pattern. Sales of electronic equipment by Canadian affiliates to countries other than the United States declined by 5 per cent, while sales to the United States increased by 190 per cent between 1977 and 1984. Unless the destination of sales by Canadian affiliates to other countries has altered significantly in favour of less-developed countries or exports of semifinished goods for further processing are somehow excluded from sales, it can be concluded that Canadian affiliates in the electrical machinery industry have not directly transferred production to affiliates (or other firms) in LDCs to any degree.

In the effect that increased trade in semifinished goods between U.S. parents and LDC affiliates is excluded from system exports, the share of Canadian affiliates increases. If, for example, U.S-parent exports to LDC affiliates were subtracted from system exports in the electrical machinery industry, the Canadian share increased from 2.9 to 3.0 per cent in 1977 and from 2.6 to 3.0 per cent in 1984. If LDC affiliate exports to U.S. parents were also eliminated from system exports, the Canadian share increased to 3.6 per cent in 1977 and 3.9 per cent in 1984.

This example illustrates that there is no necessary connection between changes in the proportion of system exports accounted for by Canadian affiliates and changes in the attractiveness of Canada as a production location for U.S. multinationals. It remains the case, however, that a link of this nature may exist. In this event, the question arises as to whether domestic and other foreign firms hold similar perceptions and have responded in a similar fashion.

A rough answer to this question can be obtained by referring to Table 5-12 which gives the proportion of world exports accounted for by Canada. For the 1977-83 period, the decline in the proportion of system exports accounted for by Canadian affiliates in the food and kindred products and primary and fabricated metals industries was not matched by a decline in the overall Canadian share of world exports. The implication is that, in these two industries, the exports of affiliates of U.S. multinationals were replaced by the exports of Canadian or other foreign-owned firms.[5]

In the other manufacturing industry, both the share of Canadian affiliates in system exports and the overall Canadian share of world exports fell by similar proportions between 1977 and 1983. The implication is that the world

Table 5-12

Canadian Share of World (Market Economy) Exports, 1966-83

	1966[1]	1977[1]	1979[2]	1982[2]	1983[2]
			(Per cent)		
Food and kindred products	2.8	1.7	2.0	2.5	2.5
Chemical and allied products	3.1	2.5	2.5	2.8	3.0
Primary and fabricated metals	6.1	3.9	3.5	4.0	4.3
Machinery	2.6	1.9	2.1	2.3	2.3
Non-electrical machinery	2.4	2.2	2.5	2.6	2.7
Electrical machinery	3.1	1.3	1.4	1.7	1.8
Transportation equipment	6.7	8.6	7.2	8.4	10.1
Other manufacturing	3.5	4.7	2.6	3.0	3.2
All manufacturing	4.0	4.1	3.3	3.8	4.2

1 Lipsey and Kravis (1985), Table A-6; and (1986), Table U-6.
2 Statistics Canada, special tabulations.

market shares of both U.S.-owned affiliates and other Canadian-based firms in this industry fell over this period.[6]

These conclusions are supported by the data in Table 5-13 on the proportion of Canadian exports accounted for by U.S. affiliates. The share of affiliates declined in the food and kindred products and primary and fabricated metals industries and increased slightly in other manufacturing.

The proportion of Canadian exports accounted for by U.S. affiliates also declined in some industries (such as transportation equipment and machinery) in which these affiliates accounted for larger shares of system exports. The implication is that while the exports of these affiliates grew more slowly than Canadian exports as a whole, they grew faster than their parents and/or fellow affiliates in other countries. This illustrates, again, that the inferences drawn regarding multinational behaviour and "performance" depend on the standard of comparison employed.

The export share experience of Canadian affiliates over the 1977-84 period is somewhat more favourable than the employment share experience. The share of Canadian affiliates in system employment in manufacturing *fell* by 14 per cent over that period (Table 5-5). The Canadian affiliate share of system exports *rose* by 8 per cent (Table 5-11). On a sectoral basis, the export share of Canadian affiliates increased more or declined less than the employment share in all but two of the industry groups listed in Table 5-11 (food and kindred products and primary and fabricated metals). Taken together with the evidence on U.S.-parent export shares presented below, this provides further support for the argument that much of the observed decrease in the share of Canadian affiliates in system employment can be attributed to the different cyclical experience of the Canadian and U.S. economies.

The shares of U.S. parents in system exports over the 1966-85 period is reported in Table 5-14. Between 1966 and 1977, the proportion of system exports accounted for by U.S. parents fell markedly in all industry groups. This decline has been documented and discussed by Lipsey and Kravis (1982, 1985). These authors conclude that, over the 1966-77 period, U.S. competitiveness in manufacturing declined. U.S. multinationals were able to maintain their competitiveness (share of world exports, Table 4-1) by transferring production from U.S. parents to lower cost foreign affiliates.

As Table 5-14 indicates, the decline in the share of U.S. parents in system manufactured exports does not continue after 1977. Decline in the parent share in some sectors (chemicals and non-electrical machinery) is offset by increases in others (food and kindred products, electrical machinery and transportation equipment). While a constant share of exports does not necessarily imply a constant share of value-adding activity, export data themselves do not support the inference of a continuing decline in U.S.-parent competitiveness and a corresponding increase in offshore sourcing over the 1977-84 period.

The employment and export share data are in rough agreement on this point. As Table 5-3 indicated, the U.S. parent share of system employment in manufacturing increased by 3 per cent between 1977 and 1984. It is also evident, however, that both in aggregate and on an industry-by-industry basis, the employment shares of parents have tended to increase more or decrease less than their export

Table 5-13

Majority-Affiliate Share of Canadian Exports, 1966-83

	1966	1977	1982	1983
			(Per cent)	
Food and kindred products	28.0	26.0	6.4	7.0
Chemical and allied products	49.5	22.6	D	27.8
Primary and fabricated metals	4.2	24.5	10.5	11.6
Machinery	36.2	35.2	D	28.7
Non-electrical machinery	–	30.5	D	27.4
Electrical machinery	–	47.8	33.1	31.1
Transportation equipment	83.3	83.1	79.0	80.4
Other manufacturing	60.6	30.4	35.7	32.5
All manufacturing	45.2	48.6	45.3	48.2

D Suppressed to avoid disclosure of data of individual companies.

SOURCE Lipsey and Kravis (1985), Table A-6; U.S. Department of Commerce (1985), Tables III.E.4 and III.E.5, and (1986*a*), Tables 37 and 38; and Statistics Canada, special tabulations.

Table 5-14

U.S.-Parent Share of Parent plus Majority-Affiliate Exports, 1966-85

	1966[1]	1977[2]	1982[3]	1983[4]	1984[5]	1985[P,6]
			(Per cent)			
Food and kindred products	50.4	44.8	42.1	51.6	56.5	56.0
Chemical and allied products	66.8	51.9	47.2	44.5	46.3	46.2
Primary and fabricated metals	77.0	55.1	64.0	58.4	57.2	54.3
Machinery	62.9	53.6	57.1	54.2	54.5	52.0
Non-electrical machinery	–	53.5	54.0	47.4	50.4	48.0
Electrical machinery	–	53.8	61.2	62.6	59.5	57.9
Transportation equipment	59.4	50.5	50.1	51.8	53.4	56.6
All manufacturing	61.8	52.0	53.1	51.5	52.2	52.6

P Preliminary figures.

1 Lipsey and Kravis, Tables A-4 and A-6; and U.S. Department of Commerce (1975), Tables L-3 and L-4.

2 U.S. Department of Commerce (1981), Tables III.H.2 and III.T.2.

3 U.S. Department of Commerce (1985), Tables III.E.2 and III.P.1.

4 U.S. Department of Commerce (1986*a*), Tables 35 and 57.

5 U.S. Department of Commerce (1987*a*), Tables 35 and 57.

6 U.S. Department of Commerce (1987*b*), Tables 35 and 57.

shares. Regression analysis reveals that, on average, an unchanged parent export share is associated with a 2.9 per cent increase in parent employment share.[7]

In sum, export share data for the 1977-84 period imply that the decentralization of production by U.S. multinationals which characterized the 1966-77 period has not continued. They also provide further reason to believe that the observed increase in parent employment shares is a consequence of cyclical and productivity growth differences between the United States and other countries rather than an explicit centralization of production.

Some interesting conclusions can also be drawn from the pattern of exports by U.S. parents to Canada. In his influential study, Horst (1972) found, using 1963 data, that the proportion of total U.S. sales in Canada (exports to Canada plus Canadian majority-affiliate sales) accounted for by exports from the United States was lower in industries with higher Canadian tariffs. The implication of Horst's results

was that a decrease in Canadian tariffs would result in a substitution of exports from the United States for affiliate production.[8] This is, of course, what many fear. It is of interest, then, to determine whether a relationship of the type established by Horst using 1963 data holds in later years. That is, is the height of Canadian tariffs still a determinant of the location from which U.S. firms supply the Canadian market?

To answer this question, we estimate the model

$$ln\,[PEAXC77/(PEXAC77 + TAS77)] = a_0 + a_1\,ln\,(1 + TR77)$$

where

PEXAC77 = exports to U.S. parents to Canadian affiliates, 1977;

TAS77 = sales of Canadian affiliates (minority and majority); and

TR77 = duties paid on imports/value of dutiable imports, 1977.

The model is estimated for 18 industries and the proportion of imports free of duty is also used as an explanatory variable. The results are unambiguous. Tariff protection variables are never close to being statistically significant. The implication is that there is no longer any tendency to rely on local supply to a greater degree in high tariff industries.

These results are not a sufficient basis for dismissing Horst's earlier findings. They rely on different data sources and do not hold other influences (relative market size) constant.[9] Moreover, U.S. parents may now supply the Canadian market from sources in third countries and this effect would not be captured. Nevertheless, these results are consistent with the argument that the investment in Canadian affiliates has a significant component which is sunk, that is, not freed up by repatriating production. As a consequence, lower Canadian tariffs result in greater trade in both directions with no change, on average, in the ratio of parent exports to affiliate sales.

6 Changes in the Organization of Production

Introduction

As the discussion in Chapter 3 concludes, trade liberalization facilitates increased international specialization by industry, product line and stage of production. Intraindustry specialization implies that both imports and exports will rise relative to local sales. Specialization by product line implies an increase in the proportion of trade accounted for by finished goods.

The consequences of specialization by stage of production depend on the stage at which specialization occurs. At one extreme is the so-called warehouse economy in which local affiliates or other firms specialize in distribution. Accompanying this would be an increase in imports of finished goods relative to domestic sales but no increase in exports. Specialization at earlier stages of production would involve a balanced increase in trade in semifinished products.

At the other extreme is hewing wood and drawing water in which local affiliates specialize in the initial stages of production. This situation is characterized by relatively high export propensities and value-added/sales ratios and relatively low import penetration unless the end-product is imported for local consumption. Specialization at later stages of production could but need not result in greater import penetration, more balanced trade with the parent and a lower value-added/sales ratio.

Evidence of each of these issues is presented in the following sections. The notion that Canadian affiliates are specializing vertically at the distribution end of the production process and that, as a consequence, Canada becoming a warehouse economy is investigated in the next section.

Specialization should be associated with a greater scale of operation at least at the level of individual product lines or stages of production. This may involve greater plant scales which may, in turn, entail greater employment per plant. The behaviour of employment per affiliate in Canada and elsewhere is then examined. While the relationship between employment per affiliate and scale at the product level is tenuous at best, the results are nevertheless instructive.

Rationalization is also associated with increases in the sales/value-added ratio of the sales/employee compensation ratio. The reasons for this association are discussed further as is the evidence on changes in the sales/employee compensation ratio in Canadian and other DC affiliates, over the 1966-84 period.

The following sections cover the trade-related indicators of rationalization: export propensities and their implications; the trade balance between affiliates and parents; and some evidence on trends in the percentage of trade accounted for by finished goods.

Relatively little in the way of new evidence on changes in multinational organization or strategy is presented here. One indicator of the possible devolution of responsibilities for entire product lines would be an increase in the proportion of system R&D carried out in the larger DC affiliates. For this reason and because the international distribution of R&D activities is of interest in its own right, this issue is investigated further.

A Warehouse Economy?

It is often said that trade liberalization will result in Canada becoming a warehouse economy. The scenario is that foreign firms engage in Canadian production solely to avoid Canadian trade barriers. Elimination of these barriers would, under these circumstances, also eliminate the incentive to engage in local production. To the extent that Canadian affiliates continued to exist, they would be confined to a distribution or warehousing function, hence the term warehouse economy.

While much of this study is devoted to the examination of the relationship between changes in trade patterns and the location of production by multinationals, it is useful to take a brief look at warehousing activities themselves. The surveys of U.S. foreign direct investment contain information of durable and non-durable goods wholesaling. The proportion of local affiliate employment accounted for by affiliates whose principal activity is wholesaling can be calculated for a wide variety of countries and a number of different years. This calculation excludes the wholesaling

activity of affiliates whose principal activity is other than wholesaling and may understate the overall fraction of affiliate employment devoted to wholesaling.

The respective proportion of affiliate employment accounted for by durable and non-durable goods wholesales is reported in Table 6-1. The table shows that:

- The proportion of employment in wholesaling is greater in the developed than in the less-developed countries.

- The proportion of employment in wholesaling is greater in both Europe and developed countries in general than in Canada.

- The proportion of employment in wholesaling has increased in all developed countries and in Europe since 1966.

- The wholesaling employment of affiliates has increased relative to their manufacturing employment in all developed countries including Canada with the rate of increase being slightly slower in Canada between 1977 and 1984 and slightly faster between 1966 and 1984.

Thus a higher proportion of affiliate employment in wholesaling seems to be a characteristic of an advanced rather than a truncated economy. The Canadian affiliate mix is certainly not more distribution and less manufacturing-oriented than the European mix. An increased proportion of employment in wholesaling and perhaps in other distributive sectors appears to be a concomittant of economic growth. This outcome may also be due, in part, to differential rates of productivity growth in manufacturing and wholesaling. Whatever the sources of this change, the recent Canadian experience appears roughly in line with developed countries in general.

Employment per Affiliate

According to the rationalization scenario described earlier, trade liberalization should result in a reduction in the number of domestic plants in a given manufacturing industry and an increase in the scale of the remaining plants. Given the technology, this implies an increase in employment per plant. Rationalization could also involve specialization by product line or stage of production *within* plants so that while the number of domestic product lines or stages of production declines, the number of plants may not decline and employment per plant need not increase.

In this section we examine the changes in average employment per majority affiliate which occurred in Canada and in other countries over the 1977-83 period. Changes in employment per affiliate, that is, employment at the corporate level, do not necessarily imply equivalent changes at the plant level. Rationalization by multiplant affiliates may involve fewer domestic plants and greater employment per plant (given technology) with employment per affiliate either increasing or decreasing. The same is true of single plant affiliates able to rationalize by product line or by stage of production.

While the link between employment per affiliate and rationalization is tenuous and errors of interpretation may arise as a result of intercountry differences in the number of affiliates per parent in a particular industry, the change in the number of employees per affiliate is nevertheless one

Table 6-1

The Relative Importance of Wholesale Trade Employment by Majority Affiliates of U.S. Multinationals, 1966, 1977 and 1984

	Percentage of affiliate employment in wholesale trade						Employment in wholesale trade as a percentage of manufacturing employment		
	Durable			Non-durable					
	1966[1]	1977	1984	1966[1]	1977	1984	1966[1]	1977	1984
Canada	2.2	5.5	4.0	0.2	0.6	0.9	3.5	6.3	8.9
Developed countries	3.9	5.9	7.3	1.0	1.5	2.6	6.6	10.3	14.8
Europe	4.6	6.7	7.9	1.2	1.7	3.1	7.3	10.9	15.2
Developing countries	4.3	2.9	3.5	1.7	1.1	1.7	12.2	6.0	7.5

1 Assuming 1977 proportion of durable and non-durable trade holds.

SOURCE U.S. Department of Commerce (1975), Table K-1; (1981), Table III.G.4; and (1987*a*), Table 47.

form of economic adjustment which can be compared across countries within industries.

Average employment per majority affiliate by industry in various countries in 1977 and 1983 is reported in Table 6-2. Canada and developed countries as a whole are compared in Table 6-3. The tables show that: a) employment per majority Canadian affiliate in 1977 was similar to the DC average in three industries (food and kindred products, chemical and allied products and other manufacturing), smaller in four (primary and fabricated metals, non-electrical machinery, electric and electronic equipment and transportation equipment) and larger in one (petroleum); b) average employment per Canadian majority affiliate increased relative to the DC average in four industries (chemical and allied products, non-electrical machinery, electric and electronic equipment and transportation equipment) and declined in the other three.

The industries in which Canadian affiliate average employment declined relative to the DC average are also the industries in which the proportion of system (parent plus all affiliates) exports accounted for by Canadian affiliates declined (see Table 5-11). They are also the industries in which the export propensities of Canadian affiliates declined relative to DC affiliates as a group (Table 6-8). Thus there is a link of sorts between increased trade participation and average affiliate size.

The Sales/Employee Compensation Ratio

The discussion in Chapter 3 concluded that one indicator of specialization is a decline in the value-added/shipments ratio. The data on U.S. affiliates used in this study do not allow the calculation of this ratio. It is possible to calculate the ratio of employee compensation to sales or its inverse. The interpretation of this ratio is the topic of this section. First, we give two very simple examples of the respective effects of horizontal and vertical specialization on the sales/employee compensation ratio. Second, we report and discuss the calculated values of this ratio for Canada and other geographic areas for the years 1966, 1977 and 1984.

We begin with an example of an affiliate with two product lines, 1 and 2. Sales of each line amount to $100 which is comprised of $50 in employee compensation and $50 in other inputs. Sales are confined to the domestic market. The sales/employee compensation ratio is 2. Suppose now that trade is allowed and the affiliate specializes in line 1. Domestic requirements of line 2 are imported by the affiliate. With constant returns to scale, the same $200 worth of inputs now produce $200 worth of line 1, half of which is exported. Total sales are now $300 (domestic sales of lines 1 and 2 of $100 each plus $100 in exports of line 1). The sales/employee compensation ratio increases to 3. The increase would be greater yet in the presence of increasing returns to scale. Note that if line 2 is imported by another affiliate, say in wholesaling, the effects of this rationalization will not show up in the sales/employee compensation ratio at either the manufacturing affiliate or industry level.

Similar results occur in the case of vertical specialization. Assume an affiliate with one product line and two stages of production. Employee compensation is $50 at each stage as is the cost of all other inputs. The resulting product has a value of $200 and is sold domestically. Trade is now allowed and the affiliate specializes in stage 1. Applied at stage 1, the $200 in inputs now produce $200 worth of stage 1 output (assuming constant returns to scale), all of which is exported. Domestic requirements of the finished product in the amount of $200 are imported by the affiliate. The sales/employee compensation ratio increases from 2 to 4.

While an increase in the sales/employee compensation ratio is consistent with the rationalization of a given amount of domestic value-adding activity of the type illustrated in the examples, it is also consistent with the simple transfer of domestic value-adding activity abroad. In the rather perjorative terminology of Chapter 1, an increase in the sales/employee compensation ratio may also imply that the industry in question is becoming "hollow." To complicate matters further, the value-adding activity of a domestic industry may be transferred to another *domestic* industry leaving total domestic value added unchanged.

In order to determine whether domestic production is being rationalized internationally or is simply being transferred abroad, additional information is required. Trade data are useful in this connection. A sufficient condition for a trade-based rationalization is that both sales/employee compensation and exports/sales increase. A sufficient condition for the transfer of production abroad is an increase in *both* sales/employee compensation and imports/sales with exports/sales not increasing. Finally, a purely domestic interfirm rationalization of production would increase sales/employee compensation leaving both exports/sales and imports/sales unchanged.

The respective ratios of sales per dollar of employee compensation for Canadian, European, developed country and DC majority affiliates for the years 1966, 1977, 1984 are reported in Table 6-4. A comparison of Canadian and DC majority affiliates is reported in Table 6-5.

Table 6-2

Employees per Majority Affiliate, 1977 and 1983

	Food and kindred products		Chemical and allied products		Primary and fabricated metals		Non-electrical machinery		Electric and electronic equipment		Transportation equipment		Other manufacturing	
	1977	1983	1977	1983	1977	1983	1977	1983	1977	1983	1977	1983	1977	1983
Canada	610	589	326	388	308	264	382	369	632	634	1,610	1,818	459	417
Europe	647	611	344	356	379	334	727	625	1,095	806	3,561	2,510	452	449
France	791	774	329	349	263	231	1,043	848	913	484	3,544	945	510	579
Germany	636	717	421	487	554	548	854	922	1,476	1,300	7,793	9,557	411	466
Netherlands	410	458	310	318	374	370	440	312	408	236	D	300	D	130
United Kingdom	1,481	1,340	553	501	476	343	827	546	1,102	522	4,352	2,497	669	604
Spain	477	410	266	253	226	258	561	506	2,377	2,217	2,474	2,775	260	275
Sweden	D	350	79	127	123	175	571	840	D	D	170	D	275	217
Australia	430	427	269	337	171	121	274	246	445	460	2,833	D	318	D
Latin America	673	609	335	357	440	455	518	546	651	849	1,976	1,871	651	603
Other Asia and Pacific	D	897	293	292	214	206	857	513	1,426	1,504	D	569	D	802
Developing countries	675	648	313	331	400	402	552	532	945	1,122	1,785	1,555	679	632
Developed countries	601	583	325	354	341	301	635	555	924	734	2,747	2,293	445	436

D Suppressed to avoid disclosure of data of individual companies.

SOURCE U.S. Department of Commerce (1981), Table III.G.3; (1986), Table 46; and Bureau of Economic Analysis, special tabulations.

Table 6-3

Employment per Majority Affiliate: Canada vs. Developed Countries, 1977-83

	Canada/ Developed countries		
	1977	1983	Difference
Food and kindred products	1.02	1.01	–0.01
Chemical and allied products	1.00	1.10	0.10
Primary and fabricated metals	0.90	0.87	–0.03
Non-electrical machinery	0.60	0.67	0.07
Electric and electronic equipment	0.68	0.86	0.18
Transportation equipment	0.59	0.79	0.20
Other manufacturing	1.03	0.96	–0.07
Petroleum	1.10	1.36	0.20

SOURCE See Table 6-2.

Table 6-4 shows that the sales/employee compensation ratio of Canadian affiliates rose over the 1966-84 period in all industries except food and kindred products. The largest percentage (and absolute) increase occurred in transportation equipment. Employee compensation also accounts for the smallest proportion of sales revenue in this industry (1/9.66 = 10.4 per cent). At the other end of the spectrum is electric equipment in which the compensation costs of Canadian majority affiliates account for 26.4 per cent (1/3.79) of sales revenue.

The Canadian experience is similar, though by no means identical to the experience of European affiliates. The most obvious contrast is in the case of transportation equipment. Here the sales/employee compensation ratio fell between 1966 and 1984 and is now less than half the Canadian ratio.

Making use of the export propensities reported in Table 6-6 we find that, in the Canadian case, the behaviour of exports/sales and sales/employee compensation is consistent with a trade-based rationalization of production in chemicals, machinery, transportation equipment and other manufacturing and, over the 1966-77 period, only primary and fabricated metals. Food and kindred products, with declines in both sales/employee compensation and exports/sales, appears to be moving in the opposite direction.

Table 6-5 shows the experience of Canadian affiliates relative to DC affiliates. Employee compensation accounts for a greater proportion of sales revenue in four industries (food and kindred products, chemical and allied products, primary and fabricated metals, and other manufacturing). Again, this could be a consequence of any or all of a higher price or lower productivity of labour (relative to other inputs), greater horizontal or vertical integration or operating at an earlier stage in the production process.

Taking the relative sales/employee compensation measure from Table 6-5 together with the relative export propensity data from Table 6-7, we find that there are two unambiguous cases. Canadian affiliates have engaged in trade-based rationalization to a greater degree than the DC average in transportation equipment and appear to have moved toward autarky faster in food and kindred products.

Export Propensities

Specialization, whether horizontal or vertical, should result in an increase in both exports and imports relative to local sales. In this section we examine the behaviour of the respective export propensities (exports relative to total sales) of Canadian and other majority foreign affiliates of U.S. multinationals over the 1966-84 period.

The respective export propensities of Canadian and both developed country and all affiliates are reported in Table 6-6. From the data in these tables, the following inferences regarding the general pattern of export propensities can be drawn:

- Export propensities have increased over time among both developed country and all affiliates in all industries.

- Export propensities tend to be higher among DC affiliates except in the machinery and electric equipment industries.

- Export propensities tend to be highest in the transportation equipment industry followed by the electric equipment and electrical machinery industries and lowest in the primary and fabricated metals and food and beverage industries.

With respect to the Canadian experience, the following inferences can be drawn:

- Export propensities of Canadian affiliates are lower than the respective weighted averages of all affiliates and all DC affiliates in all industries except transportation equipment.

- Export propensities of Canadian affiliates have increased since 1966 in all industries except food and kindred products and since 1977 in all industries except food and kindred products and primary and fabricated metals.

Table 6-4

Sales/Employee Compensation Majority Affiliates, 1966, 1977 and 1984

	Canada			Europe			Developed countries			Developing countries		
	1966	1977	1984	1966	1977	1984	1966	1977	1984	1966	1977	1984
Food and kindred products	6.90	6.26	6.17	7.67	6.81	7.66	7.33	6.62	7.30	8.15	8.45	9.09
Chemical and allied products	4.89	5.07	6.22	6.73	6.25	8.05	6.14	5.92	7.35	5.79	6.54	7.61
Primary and fabricated metals	3.90	3.65	4.54	4.48	4.33	4.90	4.29	4.08	4.83	6.23	5.59	5.42
Machinery	4.03	3.50	4.22	3.84	3.39	4.20	3.98	3.47	4.32	4.67	5.10	7.05
Non-electrical machinery	–	3.65	4.56	–	3.69	4.52	–	3.73	4.62	–	4.12	7.60
Electric and electronic equipment	–	3.35	3.82	–	2.92	3.57	–	3.06	3.76	–	5.78	6.77
Transportation equipment	5.93	8.11	9.69	5.09	4.96	4.39	5.62	5.88	6.31	7.25	7.01	6.52
Other manufacturing	4.05	3.62	4.13	4.31	3.96	4.76	4.28	3.85	4.59	5.47	5.37	5.53

SOURCE U.S. Department of Commerce (1975), Tables K-2 and L-3; (1981), Tables III.F.5 and III.G.6; and (1987*a*), Tables 29 and 48.

Table 6-5

Sales per Dollar of Employee Compensation, Canada/Developed Country Majority Affiliates, 1966, 1977 and 1984

	1966	1977	1984	1984/66	1984/77
Food and kindred products	0.94	0.95	0.85	0.90	0.89
Chemical and allied products	0.80	0.86	0.85	1.06	0.99
Primary and fabricated metals	0.91	0.89	0.94	1.03	1.06
Machinery	1.01	1.01	0.98	0.97	0.97
Non-electrical machinery	–	0.98	0.99	–	1.01
Electric and electronic equipment	–	1.09	1.02	–	0.94
Transportation equipment	1.06	1.38	1.54	1.45	1.12
Other manufacturing	0.95	0.94	0.90	0.95	0.96

SOURCE See Table 6-4.

Table 6-6

Canadian Majority-Affiliate Export Propensities, 1966, 1977 and 1984

	1966			1977			1984		
	Canada	DC affiliates	All affiliates	Canada	DC affiliates	All affiliates	Canada	DC affiliates	All affiliates
					(Per cent)				
Food and kindred products	8.0	9.8	11.8	6.2	14.8	14.8	3.0	17.0	17.0
Chemical and allied products	11.8	15.7	13.8	8.7	30.8	26.1	12.5	36.6	32.6
Primary and fabricated products	3.3	9.2	9.9	25.6	26.7	26.8	24.1	29.8	27.2
Machinery	8.8	24.3	22.8	15.8	34.5	35.6	23.3	38.6	43.5
Non-electrical machinery	–	–	–	18.8	38.3	36.7	26.0	42.4	42.7
Electrical machinery	–	–	–	12.4	27.6	33.7	19.3	29.9	45.0
Transportation equipment	28.5	26.6	25.0	50.6	42.7	38.8	63.5	51.3	48.9
Other manufacturing	23.8	19.8	17.5	28.5	31.9	28.6	31.6	36.6	33.4
All manufacturing	16.1	20.4	18.6	29.9	33.1	30.8	39.4	38.4	37.3

SOURCE U.S. Department of Commerce (1975), Tables L-3 and L-4; (1981), Tables III.H.3, III.H.4 and III.H.5; and (1987*a*), Tables 36, 37 and 38.

The relative magnitudes of Canadian and all affiliate export propensities are reported in Table 6-8. The export propensities of Canadian affiliates have improved relative to all affiliates in non-electrical and electrical machinery and chemicals industries since 1977. A steady decline is apparent in other manufacturing and especially in food and kindred products.

The implications of these findings are that Canadian affiliates appear to be participating at least proportionately in system-wide increases in export propensities in the more export-intensive industries.

The one unambiguous case of relatively low and declining Canadian affiliate export propensities is food and kindred products which is, by a large margin, the least trade-oriented of all the industry groups. This is also the industry group which, as the discussion in Chapter 5 suggested, there is clear evidence of a reallocation of affiliate and system employment away from Canada.

Trade Balance of Affiliates with the United States

The increase in affiliate export propensities observed earlier should be accompanied by increased import penetration (imports/domestic sales) if geographic specialization is occurring. In the matter of affiliate imports, the surveys of U.S. foreign direct investment are of limited use in that they report only the imports of affiliates from the United States.

Table 6-7

Canadian Majority-Affiliate Export Propensities/Developed Country and All Majority-Affiliate Export Propensities, 1966, 1977 and 1984

	1966		1977		1984	
	Canada/DC affiliates	Canada/All affiliates	Canada/DC affiliates	Canada/All affiliates	Canada/DC affiliates	Canada/All affiliates
	(Per cent)					
Food and kindred products	0.82	0.68	0.42	0.42	0.17	0.18
Chemical and allied products	0.75	0.92	0.28	0.33	0.34	0.38
Primary and fabricated metals	0.36	0.33	0.96	0.96	0.81	0.89
Machinery	0.36	0.39	0.46	0.44	0.60	0.54
Non-electrical machinery	–	–	0.49	0.51	0.61	0.61
Electrical machinery	–	–	0.45	0.37	0.65	0.43
Transportation equipment	1.07	1.14	1.19	1.30	1.04	1.30
Other manufacturing	1.20	1.36	0.89	1.00	0.94	0.95
All manufacturing	0.79	0.87	0.90	0.97	1.03	1.06

SOURCE See Table 6-6.

Table 6-8

Majority-Affiliate Trade Balance with the United States, Expressed as a Proportion of Trade, 1966, 1977 and 1984

	1966		1977		1984	
	Canada	Europe	Canada	Europe	Canada	Europe
Food and kindred products	–0.26	–	–0.52	–0.27	–0.37	–0.49
Chemical and allied products	–0.32	–0.86	–0.46	–0.67	–0.23	–0.35
Primary and fabricated metals	–0.59	–0.66	0.37	–0.67	0.13	–0.35
Machinery	–0.56	–0.38	–0.41	–0.46	–0.28	–0.46
Non-electrical machinery	–	–	–0.37	–0.44	–0.27	–0.48
Electrical machinery	–	–	–0.46	–0.50	–0.28	–0.37
Transportation equipment	–0.21	–	–0.09	0.09	–0.03	0.10
Other manufacturing	0.41	–	0.22	–0.55	0.32	–0.53
All manufacturing	–0.18	–0.50	–0.08	–0.45	–0.04	–0.42

SOURCE U.S. Department of Commerce (1975), Tables E-11 and L-5; (1981), Tables III.I.3 and III.I.19; and (1987*a*), Tables 52 and 53.

The imports of affiliates in most-developed countries from the United States have generally fallen relative to their local sales since 1977.

Some useful information is provided by calculating the trade balance of affiliates with the United States. The trade balance expressed as a proportion of trade with the United States is defined as:

$$B_{ij} = (X_{ij} - M_{ij})/(X_{ij} + M_{ij})$$

where

B_{ij} = balance of trade of affiliates in industry i and country j with the United States;

X = exports to the United States by affiliates; and

M = imports from the United States by affiliates.

The trade balance of affiliates in Canada and Europe with the United States for the years 1966, 1977 and 1984 is reported in Table 6-8. A value near zero implies balanced trade. A value near –1 implies that affiliates are specialized to importing (i.e., to the final stages of production or distri-

bution). A value near 1 implies that affiliates are specialized to exporting. One case where this occurs is when an affiliate is specialized to the initial stages of production (i.e., resource extraction) with subsequent stages of production and consumption occurring elsewhere. A move toward more balanced trade is consistent with either specialization in intermediate stages of production (importing and re-exporting semifinished goods) or specializing by product line.

The results in Table 6-8 indicate, first, that trade between U.S. and Canadian affiliates tends to be more balanced than trade between U.S. and European affiliates. Second, with one exception, trade between U.S. and Canadian affiliates has tended to become more balanced over time. The exception is food and kindred products in which Canadian and European affiliates are both highly and increasingly import-dependent (vis-à-vis the United States).

Several other results are noteworthy. There has been a steady movement from import specialization toward balanced trade in the machinery industry. There is some indication of movement from export specialization toward balanced trade in other manufacturing. One possible explanation in each case is specialization either by product line or in intermediate stages of production.

The Composition of Imports

It has been argued above that trade liberalization facilitates horizontal and/or vertical specialization on an international basis. Horizontal specialization can also be called product line specialization. A small proportion of the possible product varieties are produced locally with the balance being provided by similarly specialized foreign producers. This allows the realization of potential economies of batch size (run length).

An increase in horizontal specialization implies that there will be proportionately more trade in finished products. There is some evidence on the proportion of affiliate imports accounted for by goods intended for resale without further processing. This evidence is reported in Table 6-9. The weakness of this evidence is that it relates only to affiliate imports from U.S. parents. Imports of finished goods from other sources are not included. The evidence is nevertheless worth considering.

The table reveals that trade in finished goods has the following characteristics:

- The proportion of finished good imports varies across industries, being higher in the transportation equipment, (non-electrical) machinery and electric equipment industry groups, and lowest in food and kindred products and primary and fabricated metals industry groups.

- The proportion of finished good imports (from the U.S. parent) is higher in developed than in less-developed countries and is generally highest of all in Canada. Exceptions occur in transportation equipment and other manufacturing where finished goods accounted for a higher proportion of parent exports to European than to Canadian affiliates in 1982.

Table 6-9

Finished Goods, as a Percentage of U.S.-Parent Exports to Majority Affiliates, 1966, 1977 and 1982

	1966			1977			1982		
	Canada	DC affiliates	LDC affiliates	Canada	DC affiliates	LDC affiliates	Canada	DC affiliates	LDC affiliates
Food and kindred products	41.8	20.6	3.2	18.3	16.4	16.8	13.9	6.7	2.0
Chemical and allied products	55.7	52.4	29.3	51.7	41.5	23.1	30.8	16.3	7.9
Primary and fabricated products	30.2	28.1	5.9	31.4	27.1	15.8	15.3	14.4	2.3
Machinery	41.6	40.7	34.7	–	–	–	–	–	–
Non-electrical machinery	–	–	–	42.9	38.5	38.7	29.1	24.3	12.9
Electrical machinery	–	–	–	46.9	45.7	11.7	28.3	22.7	0.6
Transportation equipment	31.2	33.1	19.0	65.9	64.6	61.6	28.1	28.0	87.6
Other manufacturing	32.2	37.4	9.1	40.4	38.4	18.5	15.1	19.6	6.4

SOURCE U.S. Department of Commerce (1975), Tables E-13 and E-11; (1981), Tables III.I.15 and III.I.3; and (1985), Tables III.G.3 and III.G.15.

• The proportion of U.S.-parent exports to affiliates accounted for by finished goods declined between 1966 and 1982 in virtually all industries and countries. This is not to say that affiliates may not now be obtaining more finished goods from other affiliates rather than the parent. By themselves, however, these data do not support the argument that geographic specialization within multinationals is occurring on a product line basis. They point instead to vertical specialization.

The International Distribution of R&D within U.S. Multinationals

The international distribution of R&D within multinational enterprises has been investigated by Behrman and Fisher (1980), Lall (1985) and Hirschey and Caves (1981). These studies have focused on the distribution of R&D between the U.S. parent and foreign affiliates as a group. There has been no attempt to date to explain interaffiliate differences in R&D intensity (i.e., within industries across countries).

The analysis of the distribution of R&D between the U.S. parent and foreign affiliates has established that the proportion of overseas R&D increases as the minimum efficient scale of an R&D operation decreases and as the incidence of country-specific research requirements increase. The merits of centralizing the research function clearly depend on the type of research involved, basic versus applied, product versus process.

The question to be addressed in this study is a simpler one. It is whether there has been a reallocation of R&D activities by U.S. multinationals and if so in which industries and toward which countries. The analysis in Chapter 5 concludes that there was some centralization of employment toward U.S. parents between 1977 and 1984. Has there been a proportionate shift in R&D employment?

The data reported in Table 6-10 are R&D employment intensities for 1977 and 1982. These data imply that within broad industry categories, Canadian affiliates tend to be less R&D-intensive than the weighted average of their European counterparts. The differences are marginal in the low R&D-intensity industries (food and kindred products, primary and fabricated metals). In another more research-intensive industry, non-electrical machinery, Canadian affiliates are as research-intensive as their European counterparts.

In other industries, most notably electric and electronic equipment and transportation equipment, the gap between European and Canadian affiliates is quite large. This is apparently not due to Canada's attracting less R&D-oriented U.S. parents as investors. As the last two columns of the table demonstrate, the research intensity of parents with at least one majority affiliate in Canada is very similar to that of all parents.

With respect to changes and relative changes in research intensity, Table 6-10 indicates that over the 1977-82 period, the ratio of R&D employees to total employment rose in all industries and in all countries or areas given in the table. Percentage changes are as follows:

	Canada	Europe	U.S. parents
Food and kindred products	50.0	36.4	33.3
Chemical and allied products	38.1	58.1	36.2
Primary and fabricated metals	100.0	37.5	40.0
Non-electrical machinery	107.1	16.7	51.2
Electric and electronic equipment	83.3	82.8	72.5
Transportation equipment	83.3	183.3	79.5
Other manufacturing	60.0	141.7	38.9
All manufacturing	66.7	80.0	63.3
Petroleum	0.0	−21.4	−16.7

As a crude generalization, changes in the R&D intensity of Canadian affiliates were roughly proportional to those experienced in the United States or Europe. A caveat is that this is a short period characterized by significant employment declines in most countries and industries and thus that the observed increases in R&D intensities, especially in Europe, may speak more to the relative cyclical insensitivity of R&D employment than to any change in organizational design or strategy.

Table 6-10

R&D Employees, as a Percentage of Total Employees – U.S. Parents and Majority Affiliates, 1977 and 1982

	Canada		Europe		United Kingdom		Germany		U.S. parents		U.S. parents*	
	1977	1982	1977	1982	1977	1982	1977	1982	1977	1982	1977	1982
Food and kindred products	0.6	0.9	1.1	1.5	1.4	1.6	1.5	2.2	0.9	1.2	0.9	1.2
Chemical and allied products	2.1	2.9	3.1	4.9	4.2	6.8	2.7	4.2	4.7	6.4	4.7	6.3
Primary and fabricated metals	0.5	1.0	0.8	1.1	0.8	1.6	0.8	1.2	1.0	1.4	0.9	1.4
Non-electrical machinery	1.4	2.9	2.4	2.8	2.6	2.1	2.8	4.2	4.3	6.5	4.2	6.8
Electrical machinery	1.3	2.0	2.9	5.3	4.5	3.3	3.3	7.2	4.0	6.9	3.9	6.4
Transportation equipment	0.6	1.1	1.8	5.1	2.1	6.4	1.6	6.1	4.4	7.9	4.0	7.5
Other manufacturing	0.5	0.8	1.2	2.9	1.3	2.8	2.3	5.6	1.8	2.5	1.8	2.6
All manufacturing	0.9	1.5	2.0	3.6	2.4	3.8	2.2	5.1	3.0	4.9	3.0	4.9
Petroleum	1.4	1.4	1.4	1.1	1.7	1.6	D	1.8	2.4	2.0	2.4	2.2

*Denotes U.S. parents with at least one majority affiliate in Canada.
D Suppressed to avoid disclosure of data of individual companies.
SOURCE U.S. Department of Commerce (1981), Tables III.S.1 and III.G.5; and (1985), Tables III.O.1 and III.F.5.

7 Conclusion

This study proceeds on the premise that industrial adjustment is a continuous process of locational and organizational change in response to changes in the technological and economic environment. Industrial adjustment continues whether trade policy changes or not. Trade liberalization need not add significantly to the adjustment required. Indeed, trade liberalization can made adjustment less costly. This type of dynamic gain from trade liberalization could be significant but has yet to be measured.

Given that industrial adjustment is an on-going phenomenon and that in most economies, especially Canada's, it is trade-related, a good method of determining how it will proceed in the future is to examine past experience. This study adopts that approach.

The concern of this study is with adjustment by multinational companies. The fear is often expressed by the public and politicians that multinationals are less "loyal" to the host economy than are local firms. Multinationals, it is thought, are footloose, shifting production elsewhere at the slightest hint of deterioration in local economic conditions or of provocation by the host government. Domestic firms, multinational or otherwise, are thought less inclined to do this.

In one sense, attempts to compare the adjustment behaviour of multinational and domestic firms is somewhat idle. Multinationals differ from purely domestic firms both in the segments of the market they inhabit and in the technology and organization they employ. They face different adjustment pressures and will respond to them in a different way. Virtually by definition, a domestic firm does not shift production to affiliates abroad. More generally, it will be methodologically difficult, if not impossible, to hold all the market and technological characteristics of two firms constant and attribute residual differences in adjustment behaviour to ownership.

This study attempts to measure the extent of locational and organizational adjustment by U.S. multinationals over the 1966-84 period and to determine its impact on Canada. With respect to the locational dimension, the study suggests measures of changes in the international distribution of production by U.S. multinationals. It then investigates whether and under what circumstances there has been a redistribution of activity either toward or away from Canada.

With respect to the organization of production, the study attempts to define the term "rationalization" and to develop measures of it. It then investigates whether and under what circumstances Canadian affiliates can be construed as having rationalized both in absolute terms and relative to affiliates in other countries.

The study begins with a review of the existing literature on industrial adjustment by multinationals. The issues are as follows:

1 What type of production is most likely to be transferred offshore? Technologically separable, labour-intensive stages of production are most likely to be transferred to lower-cost production locations. The most prominent examples are the textiles and apparel industries and the electronics industry. Favoured locations include Central America and the Carribean and the Far East. The foreign producer tends to be an affiliate in the electronics industry and an independent contractor in the textiles and apparel industries.

2 Are multinationals more inclined to transfer production offshore? There is evidence for Australia that the long-run responsiveness of the share of imports in domestic consumption increases with the degree of foreign ownership of the industry involved. That is, the proportion of domestic production shifted offshore in response to a reduction in domestic competitiveness increases with the proportion of the domestic industry accounted for by foreign firms. There is evidence for the United States that, once industry characteristics have been fully taken into account (i.e., skill levels, capital intensity, product differentiation, technological orientation, transport costs and the degree of import penetration), the relative importance of multinationals in an industry does not affect the incidence of offshore production. The essential conclusion here is that underlying industry characteristics determine both the propensity to source offshore *and* the relative importance of multinationals.

3 Does offshore production shift readily from country to country and are multinationals more "shifty" than other firms (i.e., those making use of offshore contractors)?

Multinationals have been found by one study of the electronics industry to shift production quickly but in relatively small amounts in response to local exchange rate and price level changes (a short response lag but a low response elasticity). Another Australian study finds that the responsiveness of the share of imports in domestic consumption to "transitory" changes in the relative price of imports decreases as the degree of foreign ownership of the domestic industry increases. That is, multinationals are less "shifty" than local firms. Case studies of offshore production find that it is often more stable than other production in the same industry in the United States or domestic production in general in the host country. This appears to be true whether local producers are affiliates or contractors. The modest locational responses of multinationals are attributed to their policy of maintaining diverse sources of supply.

4 Does the entry or exit behaviour of foreign-owned firms in the Canadian industry differ from that of domestic firms? In particular, are foreign firms more likely than domestic firms to exit declining industries or industries subject to trade pressures? The entry and exit behaviour of foreign-owned firms in Canada is more or less random. One preliminary statistical Canadian study concludes that a given increase in the rate of growth of imports would increase the closure rate of foreign-owned plants by 2.7 times as much as domestically owned plants. A study of matched pairs of foreign and Canadian firms found the opposite. Affiliates facing adjustment pressures were not contemplating exit. Canadian firms tended to list a move to the United States among the options being considered. The OECD (1985) concludes on the basis of its examination of the subsidiary closure behaviour of multinational firms in member countries that:

> In the area of subsidiary closure, there appears to be little difference between multinational and domestic enterprises, despite the opinion sometimes generated, for example, by media publicity (p. 36).

5 Do foreign-owned firms rationalize production in response to trade liberalization at the same rate as domestically owned firms? The changes associated with the rationalization of production depend on the circumstances. In the Canadian case, rationalization has been taken to imply the adoption of plant scales and production run length similar to those prevailing in the United States. Using this standard, once industry characteristics are held constant, foreign ownership does not contribute to the incidence of suboptimal plant scales in Canada. Nor has it influenced the rate of change of Canadian plant scale (relative to the United States) or length of production run during the 70s. Another Canadian study concludes that foreign-owned firms made less progress than Canadian firms in rationalizing their operations during the late 70s but that foreign firms did not have as far to go. The most recent evidence is that relatively little in the way of product line specialization is occurring among either foreign- or domestically owned firms in Canada.

In its overall assessment of the adjustment behaviour of multinationals, the OECD (1985) concluded that:

> . . . multinational enterprises as a group have been better able to adjust to the needs of the current situation and that they have, on average, made an important contribution to host economies' investment and employment positions (pp. 19 and 20).

This conclusion is based in part on the fact that multinationals are especially prominent in some of the sectors in which world trade is expanding most rapidly. Holding industry effects constant, there are fewer differences between multinational and domestic firms. Nevertheless, the former do tend to be characterized by greater emphasis on, and perhaps more timely response to, global considerations.

It is precisely these characteristics which may put multinationals at odds with national political systems which are often preoccupied with forestalling rather than facilitating economic adjustment.

Focusing now on the international redistribution of employment by U.S.-based multinationals, the following questions can be addressed:

1 Which countries have experienced increasing shares and which countries have experienced decreasing shares of U.S. multinational employment? The answer to this question depends on the time period and industry involved.

- Over the 1966-77 period, there was an expansion of affiliate employment relative to U.S. parents and an expansion of employment in continental European affiliates relative to British and Canadian affiliates. The period coincides (roughly) with the inception and expansion of the European Economic Community and with the expansion of U.S. companies beyond the adjacent and/or English-speaking locations in which they had made their initial foreign investments. Significant expansion of the employment shares of non-European affiliates such as those in Brazil and Mexico and affiliates in far eastern countries such as the Philippines also occurred.

- Over the 1977-84 period, employment in U.S. parents and in DC affiliates grew relative to DC affiliates. The

employment share of European affiliates declined with most, though not all, of the decline occurring in Great Britain. Among developing countries, Brazil, Mexico and Malaysia experienced significant increases in their respective shares of affiliate employment. The employment share experience of Canadian affiliates over the 1977-84 period was as follows:

– Employment in Canadian affiliates generally declined relative to U.S. parents and relative to the system (U.S. parents plus all majority affiliates) as a whole.

– Employment in Canadian affiliates as a group increased relative to DC affiliates. The proportion of DC affiliate manufacturing employment accounted for by Canada increased marginally. The Canadian experience varied considerably from industry to industry and this experience is highly instructive.

2 Is there any relationship between industrial characteristics and changes in the employment shares of Canadian affiliates?

• These data offer no support for the argument that Canadian manufacturing affiliates are languishing. The largest declines in the system employment shares of Canadian affiliates have occurred outside the manufacturing sector. The largest declines occurred in services (50 per cent), transportation and communications (50 per cent), and finance and insurance (28 per cent).

• Within the manufacturing sector, the employment shares of Canadian affiliates tend to increase more (decrease less) relative to parents and/or other affiliates in industries characterized by high-trade intensity and faster growing trade and trade intensity as well as higher R&D intensity. This pattern is illustrated in Table 7-1. There is also a modest tendency for employment in Canadian affiliates to increase more (decline less) relative to U.S. parents in industries in which the proportion of Canadian imports free of duty has fallen most. There is no hint in these data that reduced tariff protection has been associated with reduced Canadian employment shares.

3 Do export share data provide a different picture than employment share data?

• The parent share of system exports has increased less or declined more than the parent share of system employment in most industries. The share of U.S. parents in system manufactured exports remained more or less unchanged between 1977 and 1984.

• The pattern of Canadian affiliate export and employment share changes matches across industries, but export shares tend to increase more or decrease less than employment shares. The share of Canadian affiliates in system manufactured exports remained steady at approximately 11 per cent between 1977 and 1984.

• Changes in export and employment shares both imply a shift away from Canadian production in three industry groups: food and kindred products, primary and fabricated metals and other manufacturing. In the first two cases, U.S. affiliates appear to have been replaced by either other foreign or local firms. In other manufacturing (forest products, textiles and apparel, among others), the shift of U.S. multinationals abroad seems to reflect a decline in the advantage of producing in Canada.

4 Are Canadian affiliates of U.S. multinationals engaging in a trade-based rationalization of their production activities?

• The characteristics of rationalization depend on the circumstances. It is virtually impossible to generalize regarding the form rationalization should take. It is also difficult to determine the form it has taken. The weight of the recent evidence is that little in the way of horizontal specialization is occurring in Canada either among foreign- or Canadian-owned firms (see Chapter 3). Moreover, the anticipated response of U.S. affiliates to free trade between the United States and Canada is likely to take the form of further vertical specialization (see Chapter 3). This is corroborated to a degree by the findings in Chapter 6 that the proportion of finished goods in exports of U.S. parents to affiliates has declined significantly.

• Evidence that Canadian affiliates are engaged in a trade-based rationalization of some kind is provided by the increase in Canadian affiliate export propensities, sales/employee compensation ratios and employment per establishment and the improvement in trade balances of affiliates with the United States. The evidence is that Canadian affiliates are not only rationalizing, but rationalizing relative to affiliates in other countries in the industry groups in which world trade is growing the most quickly.

Behaviour inconsistent with rationalization is occurring in the three industry groups: food and kindred products, primary and fabricated metals and other manufacturing. These industry groups are also characterized by slower trade and trade-intensity growth. This is illustrated in Table 7-2.

Taken together with the results of the published studies surveyed in Chapters 2 and 3, the results presented here should put to rest fears that further trade liberalization will

Table 7-1

Canadian Share of Developed Country Affiliate Employment and the Growth of World Trade, 1966-84

	Percentage change in employment share of Canadian affiliates, 1977-84	Average annual growth rate in world trade, 1966-82	Average annual growth rate in world trade, 1977-82
Food and kindred products	–26	11.7(7)	6.8(7)
Chemical and allied products	12	14.3(3)	10.9(1)
Primary and fabricated metals	–17	12.1(6)	7.9(6)
Non-electrical machinery	13	13.5(4)	9.5(3)
Electric and electronic equipment	1	15.6(1)	10.7(2)
Transportation equipment	44	14.7(2)	8.7(4)
Other manufacturing	–22	13.1(5)	8.8(5)

NOTE Rank order of growth rate in parentheses.
SOURCE See Table 5-5; and Lipsey and Kravis (1986), Table U-6.

Table 7-2

Locational Change, Rationalization and Trade Growth, 1966-84

	Change in Canadian share of system exports	Change in Canadian share of DC affiliate exports	Change in Canadian relative export propensity	Change in Canadian relative employment per affiliate	R&D intensity, 1977	World trade growth, 1966-82
			(Per cent)			
Food and kindred products	–73.1	–71.6	–57.1	–1.0	0.9	11.7
Chemical and allied products	52.2	30.2	15.2	10.0	4.7	14.3
Primary and fabricated metals	–20.0	–32.3	–7.3	–3.3	1.0	12.1
Non-electrical machinery	34.5	18.4	19.6	11.6	4.3	13.5
Electric and electronic equipment	–3.7	125.8	16.2	26.5	4.0	15.6
Transportation equipment	41.0	37.4	0.0	33.9	4.4	14.7
Other manufacturing	–21.9	–26.5	–5.0	–6.8	1.8	13.1

NOTE Relative export propensity = [(exports/sales) Canadian affiliates]/[(exports/sales) all affiliates]. Relative employment per affiliate [(employment/number of majority affiliates) Canada]/[(employment/number of majority affiliates) developed countries], 1977-83. R&D intensity = (R&D scientists, engineers/total employment) U.S. parents, 1977.
SOURCE See Tables 5-11, 6-3, 6-6, 6-10 and 7-1. U.S. Department of Commerce (1981), Tables III.H.4, III.H.5 and III.T.1; and (1987*a*), Tables 37, 38 and 57.

lead to a significant diminution of the activities of Canadian affiliates of U.S. multinationals. While the data are crude, they imply that Canadian affiliates have tended to do better the greater are the opportunities for international trade. The experience of Canadian affiliates relative to European affiliates (except in transportation equipment) between 1966 and 1977 also serves as an illustration of what can happen if others reduce trade barriers and Canada does not participate. Taken in its entirety, the evidence supports the fairly firm conclusion that Canadians have much more to fear from failing to participate in the process of trade liberalization than from participating in it.

Notes

Chapter 2

1 See, for example, W. M. Corden and J. P. Neary, "Booming sector and deindustrialization in a small open economy," *The Economic Journal* 92 (December 1982):825-48.

2 Sunk costs may exert other influences. Management of multinational affiliates may be less specialized to a particular site or product line than management of local firms and thus may have less to lose in the event of closure. The hypothesis that management of multiplant firms has a higher opportunity cost than management of single plant firms and that this affects the closure decision has been tested and rejected in a U.S. context by Deily (1988).

3 Recent theoretical work on strategic exit (Ghemawat and Nalebuff, 1985) concludes that given both the expectation of continually declining demand and fixed plant utilization rates, small plants retain profitability (positive quasi-rents) longer than large plants. This gives the small plant a credible commitment to the market and leads the large plant to exit first. This continues to be true up to a point if large plants have a scale advantage over small plants. Thus a proper empirical test of the proposition that multinationals are first to leave a declining industry must hold plant scale constant.

4 Offshore assembly increases with the importance of multiplant firms and is greater in industries of intermediate technological intensity.

5 See John R. Baldwin, Paul K. Gorecki, John McVey and John Crysdale, "Entry and exit to the Canadian manufacturing sector: 1970-1979," Ottawa, Economic Council of Canada, Discussion Paper 225, 1983, Table 17. Foreign-firm exits are explained by the number of foreign firms in the industry and the number of foreign firms interacting with above-average advertising intensity. If exit was measured as a rate, the only significant explanatory variables in the model would disappear.

6 Shapiro's model is investigating two different phenomena. The first is the type of industry foreign firms are inclined to enter. The second is the speed with which foreign firms respond to opportunities to enter these industries. What is important is the entry response elasticity with respect to growth and profitability *within* the group of industries foreign firms would normally enter. Shapiro does not investigate this interaction effect.

7 Recent developments in food processing in Canada are not inconsistent with this line of reasoning. See Oliver Bertin, "Some firms thrive on multinational leftovers," *The Globe and Mail Report on Business* (13 March 1987):B4.

Chapter 3

1 The rate of growth of Canadian output can be written as follows:

$$dQ/Q = [(1 - x)(\epsilon_{D,PM} - z\epsilon_{D,PD}) - x\epsilon_{X,PX}]dt_c/(1 + t_c)$$

where

Q = domestic industry output
x = proportion of domestic output exported
$\epsilon_{D,PM}$ = cross-elasticity of demand between import-competing goods and imports > 0
z = proportion of tariff cut reflected in the price of import-competing goods
$\epsilon_{D,PD}$ = price elasticity of demand for import-competing goods > 0
$\epsilon_{X,PX}$ = price elasticity of demand for domestic exports > 0
t_c = the initial Canadian tariff rate.

2 The required increase in scale can be written as:

$$dq/q = S/(1 - S)z(dt_c/1 + t_c)$$

where

q = scale of a representative plant
S = scale elasticity = $(dq/q)/(dTC/TC) = F/qv$
F = fixed cost
v = unit variable cost.

3 $dn/n = dQ/Q - dq/q$

$= [(1 - x)(\epsilon_{D,PM} - z\epsilon_{D,PD})$

$- x\epsilon_{X,PX} - zS/(1 - S)]dt_c/(1 + t_c)$

where

n = number of import-competing goods producers.

4 If the cost function is written as:

$$TC = kF_k + vkm + Fp$$

where

k = number of product lines

F_k = product-specific fixed cost
m = average length of production run
Fp = plant-specific fixed cost,

then, if total output (km) is held constant, the increase in the average production run (or decrease in the number of product lines) required to break even after a tariff cut is:

$$dm/m = -(TC/kF_k)z[dt_c/(1+t_c)].$$

Chapter 5

1 Plant and equipment investment data provide a more timely indicator of changes in the international distribution of production by U.S.-based multinationals. These data are published annually (see, for example, Herr, 1987) and can be linked back to the 1977 benchmark survey. They are, however, even more sensitive to exchange rate movements than are export shares.

Consider the case of a small (price-taking) country in the short run. Prices of imports and exports in U.S. dollars are determined in world markets. Absent a change in the volume of trade (which would occur over the longer term), a change in this country's exchange rate would change neither the U.S. dollar value of its imports and exports nor its export share. Under the same assumptions, a change in the exchange rate would change both the U.S. dollar value of domestic plant and equipment investment and the local affiliate share of system investment activity.

Removal of exchange rate effects from multinational plant and equipment investment data is left for future research.

2 One of a number of interesting possible interpretations of the negative coefficient on *PCN*8277 is that Canadian affiliates acquired and disposed of by U.S. firms moving in and out of parent status are smaller relative to their parents than the average Canadian affiliate.

3 Let the finished goods exports of parents, LDC affiliates and DC affiliates be X_p, X_L, X_D, respectively. Let the intermediate goods exports of the parent be I_p. The LDC affiliate adds k per cent value to these goods and returns them to the parent. The parent's share of system exports is:

$$S_p = (X_p + I_p)/(X_p + X_L + X_D) + I_p + (1+k)\,I_p$$

and

$$dS_p/dI_p > 0 \text{ if } (X_L + X_D)/(1+k) > X_p.$$

The DC affiliate share of system exports is:

$$S_D = X_D/(X_p + X_L + X_D) + (2+k)\,I_p$$

and

$$dS_D/dI_p < 0.$$

4 U.S. Department of Commerce (1981), Tables III.H.4, III.H.5, III.I.7 and III.I.23; (1987*a*), Tables 37, 38, 52, 53 and 57. The proportion of U.S. exports to LDC majority affiliates accounted for by U.S. parents in 1984 is assumed to be the same as 1977.

5 There are other interpretations of this result. The rate of change in the Canadian share of world or developed economy exports can be written as:

$$g_c = S_{cu}(g_{cu} + g_{uw}) + (1 - S_{cu})g_{ocw}$$

where

g_c = rate of change of Canadian share of world exports
g_{cu} = rate of change of Canadian affiliate share of system exports
g_{uw} = rate of change of system share of world exports
g_{ocw} = rate of change of other Canadian firms share of world exports
S_{cu} = share of U.S. affiliates in Canadian exports.

Given a negative value for g_{cu}, a zero value for g_c implies that either guw or g_{ocw} or both are positive.

6 From note 4, if $g_{uw} = 0$, then $g_c = g_{cu}$ implies $g_{ocw} = g_{cu}$.

7 Results of the regression of the change in parent employment share on the change in parent export share are:

$$PSN8477 = 0.804 + 0.225\ PSE8477$$
$$(12.28)\ \ (3.31)$$

$R^2 = 0.37$, $n = 18$

where

*PSN*8477 = 1 + percentage change in U.S. parent share of system employment
*PSE*8477 = 1 + percentage change in U.S. parent share of system exports.

When *PSE*8477 is set equal to 1 (no change in export share), *PSN*8477 equals 1.029.

8 Horst's results (p. 41) imply that a decrease in Canadian tariff rates from 20 to 10 per cent would increase the share of U.S. exports in U.S. sales to Canada by 20 per cent.

9 Orr (1975), using similar but more disaggregated data and holding market size constant, refutes Horst's earlier findings. Orr's study, together with the results reported in the text, implies that interindustry differences in the proportion of U.S. sales to Canada which is produced in Canada does not depend on Canadian tariff rates. Whether this is also true in a time series context remains to be determined.

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